THE PHYSICIAN'S POCKET MANUAL.

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THE

PHYSICIANS' POCKET MANUAL

AND

YEAR-BOOK.

By G. LOWELL AUSTIN, M. D.

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[NOTICE.—The PHYSICIANS' POCKET MANUAL AND YEAR-BOOK for **1881** will contain a full resume of the Medical and Surgical Progress during the preceding year, and will be published by the first of January. Price, **$1.00** per copy. Physicians desiring to secure copies should send address and remittance as early in December as possible, so that it may be known how large an edition will be required to supply the demand. Address, Dr. G. L. Austin, 128 Tremont St., Boston, Mass.]

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CLINICAL DIAGNOSIS.

In order to succeed in the art of diagnosis, the physician should practice the "taking of cases." He should record the symptoms and physical signs present in each case, the order in which the former have been developed, the treatment adopted, the progress of the disease, and, if it terminate fatally, he should add the morbid appearances discovered after death. The following suggestions for a plan may prove useful until experience has led the practitioner to form a better one: — Always commence with the name, age and occupation of the patient. At the bedside, note the position of the patient, the condition of the body, the state of the skin, the features and expression, but avoid all unnecessary staring. Next, inquire as to the manner in which the complaint commenced, whether suddenly or gradually, or followed some other disease, or if it could be reasonably attributed to any particular cause; also ascertain the patient's previous state of health and that, in general, of his parentage.

The best way of commencing the inquiries as to the organ more especially affected is, to ask *whether* and *where* the patient suffers pain. Having thus discovered which organ is diseased, the nature of the ailment may then be ascertained by the rules laid down in the follow-

ing chapter devoted to it. Of course, in every case it is important to note the state of the pulse, respiration, tongue and appetite, together with the condition of the bowels, the amount and characters of the urine, and, if any fever exists, the temperature in the axilla. Make it a rule to always put the patient at his ease.

DISEASES OF THE HEART AND PERICARDIUM.

To be able to diagnose cardiac diseases requires considerable previous knowledge and experience. The *size* and *sounds* of the healthy heart should be well remembered; bear in mind, also, that the size is estimated by percussion, and that the sounds are best detected by means of the stethoscope. The state of the pulse affords the surest indication of the manner in which the heart is performing its office. Take notice of its frequency, regularity, fulness, strength of pulsation and its resistance to pressure. Recollect that the pulse is most frequent in infancy (110 to 120 per minute), that it ranges from 90 to 95 in children of three years of age, and in adults is usually about 72; that it is generally very slow in compression of the brain and quick in fevers, inflammation, and where there is great debility. As a rule disease of the heart may be suspected if the patient complains of pain in the left side, if there is either palpitation, blueness of the lips and face, difficulty of breathing, cough, expectoration, dropsy of the limbs, or if he has an irregular or intermittent pulse. If the symptoms have commenced suddenly, the disease is *acute*; if gradually the disease is to be regarded as *chronic*.

The acute diseases of the heart include Pericarditis, Endocarditis and Nervous Palpitation. Begin the diagnosis with percussion : —

1. [*a.*] The dulness over the heart's space is increased and of a pyramidal shape, the apex being above; the heart's sounds, especially the first, are diminished, the impulse lessened and sometimes undulatory; the apex often beats above and to the left of its normal position. [*b.*] There is difficulty of breathing, and anxiety, but rarely pain or tenderness; the pulse is rapid or irregular, the patient lies on his back, and is unwilling to change his position.

☞ The disease is **Pericarditis with Effusion.**

2. [*a.*] The dulness over the heart's space is not much, if at all, increased in extent, the sounds are normal, but are attended with a double, superficial, creaking sound; the impulse is generally increased. [*b.*] In this form or stage there is pain over the heart, increased by pressure, movement or inspiration; also anxiety, difficulty of breathing, fever, and pulse quick, often irregular or intermittent.

☞ The disease is **Pericarditis with Exudation.**

3. [*a.*] One of the heart's sounds, or both, is accompanied or replaced by a lengthened murmur. [*b.*] There is anxiety, hurried breathing, increased impulse, rapid pulse, cough and fever.

☞ The disease is **Endocarditis.**

4. [*a.*] The heart's sounds are too loud and clear, the impulse increased but abrupt, quick and brief; the apex beats in its natural place, and the pulse is not perman-

ently irregular. [*b.*] The complaint may have been caused by indigestion, gout, rheumatism, disordered menstruation, or the excessive use of tobacco, tea, or alcoholic stimulants.

☞The disease is **Nervous Palpitation.**

The chronic diseases of the heart are Hypertrophy, Dilatation, Hydropericardium, Diseases of the Valves and Fatty Degeneration. First, mark out by percussion the size of the heart, and note where the apex strikes the chest.

5. [*a.*] The area of dulness is increased; the first sound of the heart is dull, muffled and prolonged, the second sound lower pitched than natural, the impulse increased, slow and heaving; the apex beats at a lower space than in the normal condition. [*b.*] The pulse is generally firm and strong; there is generally cough, expectoration and dyspnœa.

☞The disease is **Hypertrophy of the Heart.**

6. [*a.*] The area of dulness is increased; the first sound is clear, short and sharp, resembling the normal second sound, the action often irregular, the impulse feeble; the apex beats at a lower point than natural. [*b.*] The pulse is small, feeble, or irregular and intermitting; there is distressing palpitation, dyspnœa, cough, expectoration, blueness of the face and lips, dropsy, disordered digestion and scanty urine. Hypertrophy generally coexists with these symptoms.

☞The disease is **Dilatation of the Heart.**

7. [*a.*] The area of dulness is increased; the heart's sounds are feeble and distant, the impulse lessened, sometimes undulatory; the shape of the dulness on percussion

is pyramidal, the apex above. [*b.*] Hydrothorax and general dropsy usually present.

☞The disease is **Hydropericardium.**

8. [*a.*] The area of dulness is not necessarily increased; one of the sounds of the heart, or both, is replaced or accompanied by a blowing sound. [*b.*] Note *where* the murmur is most intense and pursue diagnosis accordingly.

☞There is **Valvular Disease of the Heart.**

9. [*a.*] The area of dulness is not necessarily increased; the sounds of the heart are feeble, impulse very weak. [*b.*] The patient is also feeble, subject to palpitation, severe attacks of dyspnœa and faintings.

☞The disease is probably **Fatty Degeneration of the Heart.**

10. [*a.*] There is sudden and excruciating pain in the region of the heart, with pain radiating to the arm or through the chest; also a sense of impending death, cold clammy perspiration, fear of movement and, sometimes, dyspnœa. [*b.*] Valvular affections and fatty degeneration may also be present.

☞The disease is **Angina Pectoris** or **Spasm** of the Heart.

11. [*a.*] There is a pulsating tumor on the chest, dull on percussion, often accompanied by a systolic—rarely by a diastolic—murmur, and most generally situated on the right side of the sternum, in the second intercostal space; sometimes no distinct tumor can be detected, but the dulness over the aorta on percussion and the murmur at this part are noticeable.

☞ The disease is probably **Aneurism of the Aorta.**

[The Sphygmograph, as perfected by Dr. E. A. Pond, of Rutland, Vt., often affords very valuable information in cases of aortic or subclavian aneurism; and as it is also of use in the diagnosis of diseases of the heart, every physician should esteem it a duty to become more familiar with the employment of the instrument.

DISEASES OF THE LUNGS AND PLEURA.

From an intimate acquaintance with the morbid changes discovered in the lungs and pleura after death one is able to comprehend the physical signs indicating their presence during life. A healthy chest emits, on percussion, a clear sound; when the sound is dull it indicates that the lung is emptied of air by being compressed by fluid, as in pleurisy, or by its cells being filled with lymph, as in pneumonia. When, on the contrary, the pleura is filled with air, or the lung cells are distended, the chest will be more resonant than in the healthy condition.

A sound termed the "vesicular murmur," is produced by the air rushing into and distending the air-cells and bronchi during inspiration. In a healthy chest the sound produced by the air rushing through the bronchial tubes is masked by the loudness of the vesicular murmur; but if the air-cells are extensively blocked up, as in pneumonia and phthisis, the bronchial sounds are plainly heard, forming "*bronchial* or *tubular respiration*," when a tube is much dilated, or ends in a cavity, we meet with "*cavernous respiration*." When the ear is placed upon the chest only a buzzing sound is audible whilst a healthy person

speaks; but if the patient's air-cells are filled with solid materials, the voice is conducted to the ear through the bronchial tubes, and a more distinct sound ("*increased vocal resonance*" or "*bronchophony*,")is heard. If a cavity is present, the force of the sound is further increased, and "*pectoriloquy*" is the result. Air forced along the polished lining of a tube produces a soft sound; when forced along a roughened or contracted surface, abnormal sounds, called "*dry râles*," are produced. The grave sounds generated in the larger tubes are named "*sonorous rhonchi*," and the whistling or piping sounds, generated in the minute bronchi, are called the "*sibilant rhonchi*." When the bronchial tubes or air-cells are filled with fluid, the air bubbles through it in passing to and fro from the lungs, and *wet sounds* or "*crepitations*" are the result; these are termed large or small crepitations or "*mucous râles*," according to the size of the bubbles and therefore of the air passages in which they are generated.

The walls of the chest vary in size, shape, and mobility, in accordance with the condition of the organs they enclose. For instance, in pleurisy and pneumothorax, the affected side is expanded; in phthisis, the upper ribs generally fall in and their mobility is lessened, and so on. The general symptoms which should lead the physician to suspect pulmonary disease are, viz.: pains of the chest or side, cough, expectoration, spitting of blood, dyspnœa, night sweats, and progressive emaciation. Pursue the examination by means of percussion and auscultation, always if possible, with the patient in a sitting position and garments sufficiently removed. First inquire if the complaint has been of short standing and came on suddenly (*acute*)

or if its development was slow and gradual (*chronic*), or if he is subject to only *occasional attacks*, his health being good during the intervals.

The *acute* diseases of the lungs are- Pneumonia, Pleurisy, Pneumothorax, Bronchitis, Whooping-Cough, and Acute Phthisis. In all these complaints, direct the attention first to the lower and back parts of the chest below the scapulæ. Begin the examination with percussion.

12. [*a.*] There is distinct dulness on percussion; also tubular breathing, alone or accompanied by a fine crackling or a bubbling sound with the inspiration; there is increased resonance of the voice and increased vocal fremitus. [*b.*] There was severe shivering, followed by a dull pain in the side, thirst, hot and dry skin, little or no appetite, constipation and thick, scanty urine; the patient generally lies on his back, has a frequent, short cough, attended with *gluey*, *rusty-colored*, or *bloody expectoration*, dyspnœa, very rapid breathing, quick but soft pulse, and often delirium at night; a complicating pleurisy may be detected by physical signs; average temperature 104°; average pulse, 120, accompanied by about forty respirations in the minute.

☞The disease is **Pneumonia** or **Inflammation of the Lungs.**

13. [*a.*] There is no dulness on percussion and no tubular breathing; there are small crepitations and bubling sounds, attended by dyspnœa, cough and profuse and *frothy* expectoration. [*b.*] There are symptoms of either heart, kidney or liver trouble.

☞The disease is **Œdema of the Lung.**

14. [*a.*] There is a diminution or absence of respiratory murmur, of vocal resonance and of vibration. [*b.*] The patient lies on the affected side; there is great dyspnœa and rapid breathing, but not necessarily cough and no rusty-colored expectoration. If suppuration (empyema) has taken place, the patient complains of chills and night sweats, the pulse is small and frequent, and there is a rapid loss of flesh.

☞The disease is **Pleurisy with Effusion.**

15. [*a.*] There is no dulness on percussion; the breath and vocal sounds are normal, but a superficial *grating* sound accompanies the respiration. [*b.*] There have been chills and shivering, followed by dyspnœa and sharp pain in the side; the patient lies on the *unaffected* side; the pulse is quick, often hard; there are fever and cough, but no rusty-colored expectoration.

☞The disease is **Pleurisy without Effusion.**

16. [*a.*] There is no dulness on percussion; the breath sounds are accompanied by dry or moist râles, there is no alteration either in the voice or vocal fremitus. [*b.*] The patient complains of some fever, soreness of the chest, cough and expectoration; after the first day or two, the expectoration ceases to be frothy and becomes opaque or puriform, and is sometimes streaked with blood. The tongue is foul, the pulse frequent and often weak, but the skin is usually moist and the lips of a natural color.

☞The disease is **Acute Bronchitis.**

17. [*a.*] There is no dulness on percussion; the patient is frequently attacked with short fits of violent, rapidly-interrupted coughing, alternating with long-drawn,

shrill, crowing inspirations; the fit ends usually with the expectoration of a thick, glairy mucus, or in vomiting; during the paroxysm, the features become red or bluish, the eyes start, and the child is on the verge of suffocation. [*b.*] The foregoing symptoms are preceded for several days by fever, discharge from the nose and eyes and other signs of a "cold;" the fever soon yields to the appearance of the characteristic cough.

☞The disease is **Whooping-Cough.**

18. [*a.*] There are the physical and general signs of *acute bronchitis*, (16) accompanied by severe fever, dyspnœa, a brown tongue, rapid emaciation and prostration and profuse night sweats.

☞The disease is **Acute Phthisis.**

19. [*a.*] Percussion elicits a clear note, like that of a drum, over one side of the chest; the respiratory sounds, vocal resonance and vibration are greatly diminished or are absent; there is convexity of the affected side, bulging of intercostal spaces, diminished motion of the ribs, and often displacement of the heart.

☞The disease is **Pneumothorax.**

The *chronic* diseases of the lungs are Chronic Pleurisy, Hydrothorax, Phthisis, Chronic Bronchitis, and Emphysema. Begin the examination with percussion.

20. [*a.*] There is dulness on percussion, chiefly or entirely confined to the lower and back parts of the chest, and is associated with absence of respiration, of voice sounds, and of vibration.

☞The disease is **Chronic Pleurisy.**

21. [*a.*] The same general symptoms (20) affecting *both* sides of the chest are joined to those of a general dropsy, or of disease of the heart, kidneys, or liver; the intercostal spaces are not obliterated or the heart displaced, as in pleurisy.

☞The disease is **Hydrothorax.**

22. [*a.*] There is dullness on percussion in the upper regions of the chest, and it is attended either with feeble inspiration, jerking inspiration, tubular inspiration, dry clicking, increased vocal resonance, lessened mobility, or diminished fulness below the clavicles. [*b.*] There is cough, chiefly in the mornings, expectoration of ropy or glairy mucus, hæmoptysis, shortness of breath on exertion, general languor, pains in the side or below the clavicle, loss of flesh, night sweats, and pulse increased in frequency; there is, *probably*, a red line next the teeth, and the finger-nails are curved downwards; the temperature ought to be persistently high,—102° to 103°.

☞The disease is **Phthisis,** in the stage of consolidation of the lung by tubercle.

23. [*a.*] The dullness on percussion is over the upper part of one or both lungs, and is accompanied by crepitation, tubular breathing and increased vocal resonance. [*b.*] General symptoms as detailed in 22.

☞The disease is **Phthisis** in the stage of softening.

24. [*a.*] The dulness on percussion is over the upper part of one or both lungs, and is accompanied by trachial sounds of the breathing (cavernous respiration) and voice (pectoriloquy), or by a *splash* when the patient coughs. [*b.*] The cough and expectoration have become

severe, the emaciation rapid, the night sweats more regular and profuse; pleuritic pains affect the side, the pulse rises in frequency, the voice is often indistinct, the tongue is covered with apthæ, the patient vomits in the morning, the feet swell, and diarrhœa has set in.

☞The disease is **Phthisis** in the last stage, with one or more tubercular cavities in the lung.

25. (*a.*) The percussion note is normal, but the respiration is accompanied by dry or moist râles. [*b*]. There are about the same general symptoms as in acute bronchitis, but of slower progress and less severe.

☞The disease is **Chronic Bronchitis.**

26. [*a.*] The percussion note is abnormally clear on both sides of the chest, the respiratory sounds are feeble and indistinct, or there are the sounds of bronchitis; the resonace of the voice is lessened, the shape of the chest is spherical or barrel-shaped, and the ribs move but slightly. [*b.*] There is dyspnœa — almost asthmatic — cough and expectoration.

☞The disease is **Emphysema.**

27. [*a.*] The attacks are only occasional; during the attack, the percussion note is clear, the respiratory murmur is feeble or mixed with rhonchus or sibilant râles. [*b.*] There is great tightness of chest and intense difficulty of breathing; the face is pallid, perspiration rolls down the brow, the pulse is weak and small, and death seems to threaten from suffocation.

☞The disease is **Asthma.**

[In the diagnosis of lung diseases, especially acute phthisis, in chronic catarrh, in emphysema and in that

large and difficult class of cases in which the physical signs point only to bronchitis, while the symptoms indicate consumption, the microscope is the only safe guide of the physician.

DISEASES OF THE THROAT AND PHARYNX.

Pain or soreness of the throat, swelling of the glands below the jaw or in the neck, difficulty in swallowing, indicate disease either of the throat or œsophagus.

28. [*a.*] The mucous membrane of the throat is of a red color, with or without patches of ulceration; swallowing is painful and difficult; the uvula is elongated.

☞The disease is **Inflammation** of the **Throat.**

29. [*a.*] One, or both, tonsils is of a red color, swollen and tender on pressure; the uvula is enlarged and the fauces are filled with mucus; there is great pain and difficulty of swallowing and the patient speaks through his nose; the pulse is quick, the tongue is foul, and the skin hot.

☞The disease is **Tonsillitis.**

30. [*a.*] The palate, fauces, or pharynx are of a vivid red color, coated in parts with a thick grayish-white exudation, which, when peeled off, leaves the subjacent membrane red and bleeding, and is soon renewed. [*b.*] There is great depression, a quick, small pulse, hot, dry skin, thirst and loss of appetite.

☞The disease is **Diphtheria.**

31. [*a.*] The patient is unable to swallow food of a solid nature, except in very small morsels; a bougie passed down the throat meets with an obstruction. [*b.*]

The complaint develops gradually, and is attended with extreme emaciation.

The disease is **Stricture of the Œsophagus.**

DISEASES OF THE LARYNX.

Always examine suspected cases by the aid of the laryngoscope. Remember that in a healthy larynx, the color of the mucous membrane is *slightly red* and that the vocal cords are white. First remark the color of the membrane and note whether there are any ulcerations; see if there is any tumor in the neighborhood of the glottis or upon the vocal cords; afterwards, by directing the patient to say "ah—eh," ascertain whether the vocal cords approximate during speech in the normal manner.

32. [*a.*] A child is affected with great dyspnœa in paroxysms, rapid breathing, loud, brazen cough, hoarse voice, quick pulse, thirst, and hot, dry, skin.

☞The disease is **Croup.**

33. [*a.*] An infant suddenly awakes from sleep, or is suddenly attacked when already awake, with a loud crowing inspiration, lasting for several seconds or minutes, which as rapidly disappears; there is no cough or fever.

☞The disease is **Laryngismus Stridulus.**

34. [*a.*] The mucous membrane of the larynx, or a portion of it, is abnormally reddened and presents small ulcerations in parts; the patient complains of hoarseness or loss of voice, cough and expectoration. [*b.*] If the affection is suspected to result from syphilis, examine the chest and explore the history.

☞The disease is **Ulceration of the Larynx.**

35. [*a.*] There is a red, semi-transparent swelling of the epiglottis, or of the ary-epiglottic folds. [*b.*] There is usually intense dyspnœa, loss of voice, harsh, barking cough and difficulty of swallowing; the inspiration is loud and noisy, whilst the expiration is tolerably easy.

☞The disease is **Œdema of the Glottis.**

36. [*a.*] One vocal cord, or both, is motionless and remains stationary at the side of the larynx when the patient attempts to speak; the voice is lost, or whispering.

☞The disease is **Aphonia.**

DISEASES OF THE LIVER.

The symptoms that should lead one to suspect an affection of the liver are: pain, or a feeling of weight in the epigastrium, right side or shoulder; pale-colored evacuations, jaundice or a yellowish cast of countenance, vomiting, flatulence, dropsy of the legs or abdomen, or hemorrhage from the stomach or bowels. The size and shape of the liver are estimated by percussion, auscultatory-percussion and by palpation. Trace the upper border first, (pencilling the outlines,) beginning where the sound is clear, and continuing downwards until a dull note is elicited. Remember that before a *very dull* sound is reached, there is a portion where, from the upper edge of the liver being covered by a thin layer of lung, the sound is more resonant than that just below it. Both borders of the liver are curved; the upper partially dull line extends from the *tenth* or *eleventh* dorsal vertebra behind to the *seventh* intercostal space on a line with the centre of the axilla, and to the *fifth* intercostal space on a line with the

right nipple, from which the dulness is prolonged to the apex of the heart. The lower border corresponds, below the right nipple, with the lower margin of the ribs; in the epigastrium it generally extends two or three inches below the junction of the sternum with the lowest costal cartilage. To define the upper border, percuss strongly; at the lower, press the finger or pleximeter firmly down and strike lightly. Whenever the liver is diseased, ascertain also the dimensions of the spleen. When the liver is found to be enlarged, place the patient on the left side, with both knees bent, and the back supported by a pillow; slide the tips of the fingers or the edge of the hand from below upwards beneath the lower edge of the liver, and instruct the patient to draw a full breath. In this way both the inner and outer surfaces of the organ may often be examined, and any projections or irregularities that may be present can be detected.

First, inquire if the disease has begun suddenly [acute] or gradually [chronic] and pursue the diagnosis accordingly.

The acute diseases of the liver are, Acute Congestion, Abscess of the Liver, Jaundice, and Acute Atrophy.

37. [*a.*] The area of hepatic dulness is increased; the liver is a little tender and smooth on its surface. [*b.*] There is pain or weight in the right side, pain in the right shoulder, slight jaundice, headache, nausea or vomiting, the tongue is foul, the appetite is lost and the bowels usually confined; there is little or no fever.

☞The disease is **Acute Congestion of the Liver.**

38. [*a.*] In addition to the preceeding physical signs there are [*b*] considerable pain and tenderness on pressure over the liver, vomiting, shivering, profuse night sweats, thirst, quick pulse and emaciation; in many cases, delirium.

☞The disease is probably **Abscess** of the **Liver.**

39. [*a.*] The area of hepatic dulness is increased; there is yellowness of the skin and conjunctivæ, the urine is yellow and often deposits a thick sediment, the stools are pale, and there is increased dullness over the site of the gall-bladder. [*b.*] There is emaciation, flatulence, loss of appetite, usually drowsiness and *itching* of the skin.

☞The disease is **Jaundice,** from obstruction of the common gall-duct.

40. [*a.*] There is jaundice, *attended with diminution of the area of hepatic dulness*, pain in the epigastrium vomiting (often of blood), restlessness, delirium or coma, rapid pulse, high temperature, thirst, dry *brown* tongue and hemorrhages from the nose, stomach, bowels or uterus.

☞The disease is **Acute Atrophy of the Liver.**

Under the head of *Chronic* diseases of the liver are Fatty Liver, Lardaceous Liver, Hydatid Tumor of the Liver, Chronic Congestion of the Liver, Cancer of the Liver and Cirrhosis.

41. [*a.*] The liver is increased in size, but there is neither pain nor tenderness; the liver feels smooth and rather soft; there is no jaundice, no dropsy nor albumen in the urine; the spleen is *not* enlarged. [*b.*] The patient is feeble and liable to diarrhœa.

☞The disease is probably **Fatty Liver.**

42. [*a.*] The liver is enlarged, feels *hard* and smooth, but is not tender on pressure; there is a feeling of *fulness* in the right hypochondrium; the spleen *is* enlarged; jaundice is rare, but dropsy of the abdomen is common; the urine is copious and generally contains albumen. [*b.*] The patient is pale and anæmic, and is liable to nausea, vomiting, and diarrhœa.

☞The disease is probably **Lardaceous Degeneration of the Liver.**

43. [*a.*] The liver is *usually* enlarged (oftentimes tumor-like at some parts of its area) but *not* tender on pressure; there is *no* enlargment of the spleen, no jaundice, nor dropsy, and the patient's general health is unaffected.

☞The disease is probably **Hydatid Tumor of the Liver.**

44. [*a.*] There is a chronic enlargment of the liver attended with severe pain in the right hypochondrium or epigastrium; the shape of the liver is very irregular; there are frequently jaundice, and dropsy of the abdomen and legs. [*b.*] The patient is feeble, sallow and emaciated.

☞The disease is **Cancer of the Liver.**

45. [*a.*] The liver is diminished in size, especially over the smaller lobe; the lower border feels rough and irregular; there is usually ascites, and the superficial veins of the abdomen are enlarged. [*b.*] The patient is dyspeptic, sallow, and much emaciated; hemorrhages from the stomach and bowels are frequent.

☞The disease is **Cirrhosis of the Liver,** resulting almost always from an habitual indulgence in ardent spirits.

There is a form of Atrophy of the Liver which sometimes follows the chronic congestion produced by diseased heart; and another variety results from chronic peritonitis. The symptoms in both are similar to those of Cirrhosis, but they differ from it in their not being the effect of indulgence in alcoholic drinks.

DISEASES OF THE STOMACH.

The symptoms which should direct special attention to the stomach are, pains or uneasiness in the epigastrium or in the left or right hypochondrium, loss of appetite, nausea, vomiting, waterbrash, eructations, or excessive flatulence. The chief points to be noticed are,—the size, color and condition (moist or dry) of the tongue, also the amount of "coating" covering it. Diagnose the state of the stomach by the following means: palpation, percussion, auscultatory percussion, and the microscopic examination of the vomited matters, urine, and evacuations. Tenderness is best ascertained by pressure with the tip of the finger successively applied to each portion of the epigastrium. To estimate the size, first percuss the lower edge of the liver, and the right side of the spleen; the clear sound of the stomach is heard between these organs, and is distinguished from the colon by the clearer character of the sound elicited by percussion. The microscope should be used to examine vomited matters; employ the proper tests for fungi (torulæ and sarcinæ) or

for any casts or portions of mucous membrane that may have been thrown off from the surface of the stomach. In doubtful cases, do not fail to examine the urine; ascertain if there be any albumen, take the specific gravity and note the nature and quantity of the deposit. Always take into consideration the appearance, characters and amount of the evacuations. Begin the inquiries by asking whether the complaint has commenced suddenly (acute) or gradually (chronic).

Under the acute diseases there are only two,—Bilious Vomiting and Subacute Gastritis.

46. [*a.*] The patient is subject to attacks of vomiting of bile, mucus or acid, which are attended with headache, a foul tongue, loss of appetite, thirst, confined bowels, and scanty urine, loaded with lithates. [*b.*] In the intervals between the attacks, there are generally symptoms of *chronic gastritis* or atonic dyspepsia.

☞The disease is **Bilious Attack.**

47. [*a.*] The patient *constantly* vomits, and suffers pain and tenderness at the epigastrium; the tongue is red or coated; appetite is gone and thirst is present; the pulse is quick and feeble, and there is considerable depression of strength. [*b.*] Distinguish the complaint from a simple bilious attack by the persistent vomiting, the absence of headache, and the thirst; also examine the state of the heart, for Pericarditis may be the main trouble.

☞The disease is **Subacute Gastritis.**

Under the head of chronic diseases of the stomach are: Atonic Dyspepsia, Neuralgia of the Stomach, Chronic

Gastritis, Ulceration of the Stomach, Hæmatemesis, Perforation of the Stomach, and Cancer of the Stomach; for convenience, Dilatation of the Stomach.

48. [*a.*] The patient complains of weight, tightness or a feeling of discomfort during digestion; the tongue is large, flabby, or indented at the sides, and often thinly furred. [*b.*] Appetite is bad, and there is flatulence, coldness of the extremities, depression of spirits, feeble pulse and confined bowels.

☞The disease is **Atonic Dyspepsia.**

49. [*a.*] There is severe pain — periodical — at the epigastrium, but no tenderness. [*b.*] It seems impossible to ascertain the cause, and the patient himself cannot account for it.

☞The disease is **Neuralgia of the Stomach.**

50. [*a.*] There is dull pain or oppression shortly after food; sometimes vomiting of acid or mucus; the tongue is coated, and indented with the teeth, or red at the edges. [*b.*] Attacks of heartburn, flatulence, thirst and burning of the hands of feet are quite frequent. If attended with loss of flesh, carefully examine the condition of the lungs.

☞The disease is probably **Chronic Gastritis.**

51. [*a.*] There are fixed and severe, sharp or cutting pains *localized* in the epigastrium, back, or hypochondrium, commencing or aggravated shortly after the ingestion of food; also tenderness on pressure, and vomiting of food *with relief to the pain.* [*b.*] The patient is emaciated, the pulse feeble, the skin cool, and the

bowels usually confined; the stools are sometimes bloody, sometimes of a pitchy character.

☞The disease is **Ulceration** of the **Stomach.**

52. [*a.*] There is vomiting of *dark*, *clotted*, often acid, blood, attended by many of the symptoms of ulceration of the stomach; there are no signs of disease of the heart, or of the liver.

☞The disease is **Hæmatemesis.**

53. [*a.*] There is intense pain in the epigastrium quickly spreading over the whole abdomen; great distension and intense tenderness of the abdomen, shrunken features, coldness of the skin, and a rapid, feeble pulse. [*b.*] The patient is terribly "sick at the stomach," vomits, and is completely prostrated,

☞The disease is **Perforation** of the **Stomach.**

54. [*a.*] There are severe lancinating pain and tenderness in the epigastric or hypochondriac region, often localized; a hardness or tumor can be detected; there is vomiting of fluid-like "coffee grounds"—*without* relief to the pain. [*b.*] The patient is very feeble and *sallow*, and the emaciation is both marked and progressive.

☞The disease is **Cancer** of the **Stomach.**

55. [*a.*] The stomach is found, by percussing, to be much increased in size; there is burning pain in the epigastrium; the patient vomits large quantities of sour, frothy, dark-colored fluid, along with mucus, in which the microscope detects fungi; he is emaciated, pale and feeble.

☞The disease is **Stricture** of the **Pylorus.**

DISEASES OF THE KIDNEYS.

Anæmia, dropsy, vomiting in the early morning, attacks of bronchitis, diarrhœa, frequent urination at night, disordered digestion, or convulsions, should lead one to suspect disease of the kidneys. Indeed, in any case in which the symptoms are obscure or threatening (especially when pain is absent), the state of the kidneys should be looked after. As a first step in the examination, make a chemical and microscopic testing of the urine. Note its color, its specific gravity, and carefully ascertain if albumen is present; if no albumen be found, test for sugar. Remember the following: that the density of healthy urine should range not below 1015 nor above 1025, with 1020 as the fair average; that albumen in the urine does not necessarily imply a disease of the kidneys, but only when it is accompanied by pus, blood, or "tube casts"; and that these casts can only be detected by the microscope.

56. [*a.*] The urine is scanty, high-colored, of a high specific gravity, very albuminous, smoky, sometimes bloody, or deposits a dirty-brown sediment; the tube casts are cellular or transparent and mixed with blood-cells and particles of fibrin; the patient has dropsical swellings of the body, face and limbs, a quick pulse, thirst, and dry skin. [*b.*] Headache, thirst, nausea or vomiting, pains in the loins, and sometimes cough and dyspnœa, usually accompany the foregoing signs.

☞The disease is **Acute Tubular Nephritis** or **Acute Bright's Disease.**

57. [*a.*] The urine is not diminished in quantity, is of low specific gravity and is albuminous; the tube casts

are granular or transparent; there is œdema of the body and limbs, and anæmia. [*b.*] Intense pallor pervades the lips and skin, the face and limbs are swollen, and vomiting in the morning is a characteristic symptom.

☞The disease is **Chronic Tubular Nephritis,** or **Chronic Bright's Disease.**

58. [*a.*] The urine is highly albuminous, and the general symptoms of disease of the kidneys are present; *numerous* casts are loaded with fat or free oil.

☞The disease is **Fatty Kidney.**

59. [*a.*] The urine is pale, very albuminous, and of a low specific gravity (1005 to 1015); there are a few waxy casts; the patient is suffering also from diarrhœa or caries, or phthisis, or has enlarged spleen or liver, or syphilis.

☞The disease is **Lardaceous Kidney.**

60. [*a.*] The urine is pale, increased in quantity, of low specific gravity, and albuminous; there are large, granular or waxy tube casts; the patient is thin, pallid, feeble, and suffers from dyspepsia, dyspnœa and œdema of the legs; the skin is exceedingly harsh and dry.

☞The disease is **Granular Kidney,** or **Intertubular Nephritis.**

61. [*a.*] The urine deposits pus; a smooth, immovable tumor may be felt in the lumbar region; there is tenderness on pressure, and the patient complains of pain in the loins, thighs and testis. [*b.*] There are usually fever, shiverings and night sweats.

☞The disease is **Pyelitis,** with dilatation of the kidney.

62. [*a.*] Pus is found in the urine of a patient who has not been suffering from the causes of dilated kidney, but who presents indications of tubercular disease of the lungs.

☞The disease is probably **Tubercle of the Kidneys.**

63. [*a.*] The patient suffers excruciating pain in the loin and down in the direction of the ureter, with numbness of the thigh and retraction of the testis; there is no fever, but usually vomiting; the urine is passed frequently, is scanty, bloody, or albuminous. [*b.*] The attack is very sudden.

☞The indication is the **Passage of a Calculus Down the Ureter.**

64. [*a.*] The urine is bloody and albuminous, chiefly after exertion; the patient suffers from severe pain in the back, hip, thigh, or testis. [*b.*] Nausea and vomiting are often present, and there is generally irritableness of temper or mental depression.

☞The disease is probably **Stone in the Kidneys.**

65. [*a.*] The urine almost constantly contains blood; the patient suffers from severe pain in the loins, and a liability to attacks of vomiting; he is thin, pale, sallow, and feeble; a tumor can be felt in the lumbar regions.

☞The disease is probably **Cancer of the Kidneys.**

66. [*a.*] The patient suffers from occasional attacks of hæmaturia without apparent cause; the general health is unaffected, and the urine generally contains oxalates.

☞The disease is probably **Intermittent Hæmaturia.**

67. [*a.*] The urine contains sugar, is pale, of a straw color, of high specific gravity (1030–1050), has a faint smell, and is passed in large quantities; the patient has lost flesh and strength, complains of great thirst, sinking at the stomach, has a dry, harsh skin, and pains of the back and limbs; the appetite is voracious, and the bowels usually confined.

☞The disease is **Diabetes.**

68. [*a.*] The patient passes a large quantity of clear, colorless urine, of low specific gravity (1003–1007), devoid of sugar and albumen. [*b.*] The complaint is usually attended with thirst, dry, harsh skin, and feebleness of body and mind.

☞The disease is **Diabetes Insipidus.**

DISEASES OF THE PERITONEUM AND INTESTINES.

The symptoms that should lead one to suspect disease of the peritoneum or intestines are: pain or tenderness of any part of the intestinal canal, swelling of the abdomen, vomiting, constipation, diarrhœa, and the presence of blood or mucus in evacuations. First inquire if the patient suffers pain; if severe, observe whether it is constant or occasional, or if it is aggravated at intevals. In every case, try whether the abdomen is tender in any part.

69. [*a.*] There is continuous, severe, diffused pain

of the abdomen, with intense tenderness; the abdomen is distended; the breathing rapid and thoracic; the patient rests on his back, with the knees raised. [*b.*] There are frequent vomitings, foul tongue, confined bowels, quick and wiry pulse, thirst, hot and dry skin, and no appetite.

☞The disease is **Acute Peritonitis.**

70. [*a.*] There is pain (often commencing like colic,) of the abdomen, *confined* to one part and increased by pressure; also nausea, vomiting, confined bowels, quick, wiry pulse, thirst, hot, dry skin, and no appetite; the patient lies on his back, with the knees raised.

☞The disease is **Enteritis.**

71. [*a.*] There is severe pain, occuring in paroxysms, near the umbilicus, usually coming on suddenly but unaccompanied by tenderness on pressure; often vomiting of bile or mucus; bowels generally confined. [*b.*] The patient often groans or screams, rolls about, or presses on the abdomen to relieve the pain.

☞The disease is **Colic.**

72. [*a.*] There is constipation of the bowels, which resists all treatment; the abdomen is much distended, there are urgent vomiting, quick pulse, thirst and loss of appetite. [*b.*] Usually at some period of the case fixed pain of the abdomen comes on.

☞The disease is **Intestinal Obstruction.**

73. [*a.*] There is *griping* pain of the abdomen with some tenderness in the region of the colon; frequent desire to go to stool, attended with straining and

the passage of blood, mucus or jelly, mixed with lumps of fæcal matter; the patient is restless, has a furred tongue and thirst, the skin is cool, and the pulse is small but not much quickened.

☞The disease is **Dysentery.**

74. [*a.*] The attack has been sudden; there is constant vomiting and diarrhœa (at first of *bilious*, afterwards of "rice water" stools); the face is blue and cadaverous, voice whispering, skin and breath cold, urinary secretion suppressed, pulse exceedingly feeble or imperceptible, but the intellect quite clear; the patient suffers from violent cramps in the extremities.

☞The disease is **Asiatic Cholera.**

75. [*a.*] The patient suffers from constant vomiting and diarrhœa, of bilious or of pale watery stools, usually preceded, or attended, by a griping pain of the abdomen, and severe cramps of the extremities; the pulse is feeble, the voice husky, and there are great thirst and depression. [*b.*] In children the complaint proves singularly fatal, and is known as "Cholera Infantum." The latter is still further characterized by a rapid loss of appetite, blueness of the lips and extremities, increasing emaciation, and more or less severe head symptoms.

☞The disease is **Simple Cholera.**

76. [*a.*] The patient suffers from relaxation of the bowels, *without vomiting*, and generally attended with some griping pain; there is no fever and not much depression, but usually thirst and a deficient appetite.

☞The disease is **Diarrhœa.**

DISEASES OF THE BRAIN AND SPINAL CORD.

The chief indications of disease of the nervous centres are: any alteration in the mental functions or in the powers of motion or sensation, severe or long-continued pain in the head or spine, affections of the sight or hearing unconnected with structural changes in the organs through which these senses are manifested. In the absence of physical signs, there is more uncertainty in the diagnosis of this class of diseases than in any other. The ophthalmoscope is capable of rendering some assistance, but only in well-practiced hands.

In each case, first observe whether there is any striking alteration in the mental condition of the patient; if not, investigate the state of his powers of motion, and next ascertain if there be any change in the size of the head, or any alteration in sensation. Of course, inasmuch as all the functions of the nervous system may, in a single case, be implicated, no efforts should be spared in an attempt to get at the history of the disease.

77. [*a.*] The patient suddenly falls into a state of stupor, the pupils of the eyes are dilated, the respiration is laborious and snoring, the swallowing difficult, the power of the limbs is lost; the pulse slow and sometimes irregular and intermitting; the urine is retained, or both urine and fæces are passed involuntarily.

☞The disease is **Apoplexy.**

78. [*a.*] After exposure to the heat of the sun or to undue heat from another source, the patient becomes unconscious, the face is pale, the pupils are contracted, the breathing is snoring, the pulse is frequent, feeble and of-

ten intermitting. [*b.*] The attack has been preceded by a cessation of perspiration, a frequent desire to pass water, and giddiness.

☞The disease is **Sunstroke.**

79. [*a.*] The patient, usually a female, appears to be unconscious; the eyes are open, the body is rigid, and the limbs remain fixed in any position in which they may have been when the patient was attacked, or in which they may be placed by others during the seizure. The pulse and respiration are natural, and are very feeble.

☞The disease is **Catalepsy.**

80. [*a.*] The patient (a child) after having suffered from the symptoms of tubercular meningitis, gradually becomes unconscious; the eyes become dull, heavy or squinting, the pupils dilated, fontanelle convex and prominent, the respiration often sighing, the pulse slow, sometimes irregular, but more rapid when the child is raised up in bed.

☞The disease is **Tubercular Meningitis, (Acute Hydrocephalus).**

81. [*a.*] The patient is subject to attacks, in which he falls suddenly to the ground in a state of unconsciousness; the face is distorted, the pupils dilated, the limbs violently convulsed, the lips blue, froth issues from the mouth, and the tongue is often bitten; the pulse is sometimes scarcely perceptible.

☞The disease is **Epilepsy.**

82. [*a.*] Along with delirium, often of a furious character, the patient complains of acute pain in the head, aggravated at intervals; there are intolerance of

light and sound, contracted pupils, inability to sleep, and great restlessness. [*b.*] The face is flushed, the conjunctivæ red, the head hot, the pulse quick and hard, the tongue coated; *all food is vomited as soon as taken, and the bowels are confined.* [Do not confound with Typhoid or Typhus Fevers or with Acute Mania, or *vice versa.*]

☞The disease is **Acute Meningitis.**

83. [*a.*] In addition to delirium, the patient is exceedingly restless and unable to sleep; he has hallucinations of the senses, his hands tremble, the face is pale, the skin is covered with perspiration, the pulse feeble and quick, and the tongue moist and creamy. [*b.*] The history shows that he has been in the habit of drinking to excess. [The absence of severe headache, the feeble pulse, and the coolness of the head, distinguish the disease from Meningitis.]

☞The disease is **Delirium Tremens.**

84. [*a.*] The intellect has become gradually impaired, especially the memory of recent events; the temper is irritable; the face dull and expressionless; there is a tendency to laugh or cry on the least emotion; headache and giddiness are often present.

☞The disease is **Chronic Softening of the Brain.**

85. [*a.*] Nearly the same symptoms as preceding; but more headache, more irritability of temper, depression of mind and occasional delirium.

☞The disease is **Chronic Meningitis.**

86. [*a.*] The patient is paralyzed on one side of the face, tongue and body; the face is drawn to the opposite

side from that palsied, speech is generally imperfect, and the tip of the tongue when protruded is pushed to the affected side.

☞The disease is **Hemiplegia.**

87. [*a.*] The patient, with symptoms of disordered intellect, gradually loses the powers of sensation and motion, his lips and tongue are tremulous, and he is unable to pronounce his words, or does so imperfectly.

☞The disease is **Paralysis of the Insane.**

88. [*a.*] The patient has an awkward, unsteady gait; the feet are thrown outward and forward, the heels first coming to the ground; when his eyes are closed, he staggers and tumbles; when sitting, he can move his legs strongly; sensation in the affected limbs is very imperfect. He gradually loses his powers of motion and sensation.

☞The disease is **Locomotor Ataxia.**

89. [*a.*] After slight numbness or altered sensation in the legs and feet, a loss of motion and sensation is experienced in both the lower limbs; the patient drags his legs when walking, or loses all power over them, and also over the bladder and rectum; but involuntary starting of the limbs is often present.

☞The disease is **Paraplegia.**

90. [*a.*] There is gradual weakening of some muscles or group of muscles, followed by wasting and disappearance; the sensibility of the parts is not impaired.

☞The disease is **Progressive Muscular Atrophy.**

91. [*a*] The muscles of the body are stiff and rigid;

the features retracted into a characteristic grin; painful spasms occur at frequent intervals; severe pain is felt shooting from the epigastrium to the back; the intellect is unimpaired. [*b.*] Preceded, usually, by an injury.

☞The disease is **Tetanus.**

92. [*a.*] There is violent spasm of the throat on attempting to swallow, a horror of liquids, great restlessness, want of sleep, often maniacal excitement; the pulse is feeble, the skin covered with sweat, and the saliva is secreted in increased quantity. [*b.*] The patient has some weeks or months previously been bitten by a dog.

☞The disease is **Hydrophobia.**

93. [*a.*] The muscles are affected with a jerking, painless, involuntary motion; the tongue is projected from the mouth with a jerk and as suddenly withdrawn; the limbs cannot be kept at rest, the muscles of the face twitch, the speech is often hesitating.

☞The disease is **Chorea.**

94. [*a.*] The parts affected are continually shaking; at first the muscles can be steadied by an effort of the will, but afterwards their motions are beyond control.

☞The disease is **Shaking Palsy.**

95. [*a.*] The head is much increased in size, especially at its upper part; the fontanelles are often unclosed, the eyes protrude, and are directed downwards. [*b.*] The disease usually begins in children below six months of age, and during its progress the child becomes irascible, feeble in body and mind, and subject to convulsions.

☞The disease is **Chronic Hydrocephalus.**

96. [*a.*] The head increases in size, beginning at the occiput, and the eyes remain deep; there is no prominence of the fontanelles.

☞The disease is **Hypertrophy of the Brain.**

FEVERS.

Almost every inflammation is attended with the symptoms of fever, viz., quick pulse, thirst, increased heat of skin, loss of appetite, scanty, high-colored urine, confined bowels, and general restlessness or great weakness. In addition to the means of physical diagnosis already noted, the thermometer is necessary to enable one to obtain correctly the temperature of the patient. In severe cases, the observations should be taken twice in the day, from 7 to 9 in the morning, and from 5 to 7 in the evening. The normal temperature of the axilla is about 98.4° and any notable deviation from this, (below 97° or above 99.5°), betokens ill-health. Besides the temperature, note the state of the pulse, and the number of respirations per minute.

97. [*a.*] On the *fourth* day of illness, an eruption of *raised, red spots*, has appeared, first on the neck and face, afterwards over the whole body; the spots coalesce and form slightly elevated blotches of a crescentic shape; the tongue is coated, the fever high. [*b.*] The eruption was preceded, and is accompanied, by discharge from the nose, redness and swelling of the eyes, cough and quickness of breathing; the highest average temperature, 103°: over this, dangerous.

☞The disease is **Measles.**

98. [*a.*] On the *second* day of the fever, there has appeared on the face and neck a *diffused scarlet rash*, which, in 24 or 36 hours, extends over the whole body; the throat is inflamed, the tonsils enlarged and often ulcerated; the pulse rapid, skin hot and dry, the tongue at first coated, with red tip and edges and red elevated papillæ, afterwards clean and raw-looking. [*b.*] The eruption is usually preceded by *vomiting*, shivering, and occasional convulsions. Average temperature, at the highest, 105°; over that very dangerous.

☞The disease is **Scarlatina.**

99. [*a.*] The patient is attacked with redness, heat and swelling of some part of the body, attended with the formation of vesicles; the inflammation commences at one part and gradually spreads; there is great pain and stiffness of the parts affected, and the neighboring lymphatic glands are swollen; the accompanying fever usually high.

☞The disease is **Erysipelas.**

100. [*a.*] On the *third* or *fourth* day of illness, a *papular* eruption has appeared on the face, neck and wrists; on the fifth or sixth day the spots have become vesicular and afterwards pustular. [*b.*] The eruption is preceded by severe pain of the back, rigors, vomiting, headache, restlessness, fever, and sometimes delirium.

☞The disease is **Small Pox.**

101. [*a.*] On the second day of a mild fever there has appeared an eruption, which is at first papular, but in

a few hours becomes vesicular; the spots have no inflammatory ring around them in the first stage.

☞The disease is **Chicken Pox.**

102. [*a.*] The patient lies on his back, in a state of half consciousness or low muttering delirium, the eye is injected, the cheeks are uniformly flushed and of a dusky color, the lips are covered with sordes, the tongue dry and brown; there are thirst and absence of appetite; the pulse is rapid and feeble, skin hot, respiration increased; from the *fifth* to the *seventh* day dark colored spots appear on the body and limbs; these spots, at first elevated, in a few days become *flat*, and do not disappear. Temperature of 103.5° or less before the fourth day indicates a mild case.

☞The disease is **Typhus Fever.**

103. [*a.*] The patient suffers from great weakness, his mind is dull or wandering, the cheeks have a bright, circumscribed flush, the tongue is coated, red, fissured or dry. There are headache, thirst, loss of appetite, and purging of the bowels, the stools being of a yellow color. The pulse is quick and feeble, the skin hot, and there is swelling of the abdomen with tenderness and gurgling on pressure over the right iliac region. About or after the *seventh* day, appears an eruption of a *few rose-colored lenticular spots*, which disappear for a moment on pressure; the eruption is chiefly on the chest and abdomen. [*b.*] The premonitory symptoms were dyspepsia, sleeplessness, languor, dull pain of the head, loss of appetite, diarrhœa, and probably delirium at night.

☞The disease is **Typhoid Fever.**

104. [*a.*] The patient (during an epidemic) has been suddenly seized with rigors, headache, and pain of the back or limbs; the tongue is white, there are thirst, often vomiting, and confined bowels; the pulse is very rapid, the skin hot and dry, with occasional sweatings. There is no eruption, but jaundice is often present.

☞The disease is **Relapsing Fever.**

105. [*a.*] The patient has suffered from *severe* headache, giddiness and vomiting, followed by excessive pain of the neck and back, increased by pressure and motion; the head is drawn backwards, the jaws are often closed, and swallowing is difficult; the back is arched and painful, and tetanic spasms affect the muscles; the patient becomes delirious, the pupils are contracted, the pulse and respiration rapid.

☞The disease is **Cerebro-Spinal Meningitis.**

106. [*a.*] The patient is suddenly attacked with great prostration of strength and aching of the limbs, along with intense headache, discharge from the eyes and nose, sneezing, sore throat, dyspnœa, cough, expectoration and fever.

☞The disease is **Influenza,** which generally prevails as an epidemic.

107. [*a.*] The patient is periodically attacked with shiverings, attended with quick pulse, uneasiness, oppression of breathing or sense of fatigue; in from half an hour to two hours there are great heat of skin, restlessness, thirst, rapid, full pulse, and scanty secretion of urine;

afterwards a profuse perspiration relieves all the symptoms.

☞The disease is **Ague.**

108. [*a.*] The larger articulations or joints are swollen, hot, red, painful, and exceedingly tender; the skin is covered with a profuse, acid perspiration; the urine is scanty, high-colored, and loaded with lithates; the bowels are confined, the pulse quick and bounding, thirst is intense and the tongue is white

☞The disease is **Rheumatic Fever.**

109. [*a.*] There is no fever, but the larger articulations are painful and tender, and the suffering is increased by motion.

☞The disease is **Chronic Rheumatism.**

110. [*a.*] One or two articulations are simultaneously inflamed, subsequently become œdematous, and desquamation of the skin takes place; there is some fever, with pain as severe as in rheumatism. [*b.*] The patient has been subject to indigestion, and just previous to the attack has complained of listlessness, languor, want of appetite, acidity after meals, flatulence, and constipation.

☞The disease is **Gout.**

111. [*a.*] Both the larger and smaller articulations are inflamed and painful; there is effusion into the joint, and the limbs gradually become stiff, often useless and distorted. [*b.*] The patient, usually a female, is of a delicate constitution, and is just beginning, or ending, menstruation.

☞The disease is **Chronic Rheumatic Arthritis.**

FORENSIC MEDICINE.

Medical Evidence.—The medical witness should answer questions put to him as clearly and concisely as possible, should make his statements in plain and simple language, avoiding as much as possible technical terms and figurative expressions, and should not quote authorities in support of his opinions. With regard to notes, these should always be made at the time, on the spot, and may be used by the witness in court as a refresher to the memory, though not altogether to supply its place.

Personal Identity.—The medical man may be consulted as to marks on the body, nævi materni, scars and tattoo-marks, or regarding the organs of generation in cases of doubtful sex. With regard to scars and their permanence, Casper says, "the scars occasioned by actual loss of substance, or by wounds healed by granulation, never disappear. But the scars of leech-bites, lancet-wounds, or cupping instruments, may disappear after a lapse of time." It is extremely difficult, if not impossible, to give any certain or positive opinion of the age of a scar. With regard to the identification of the dead in cases of death by accident or violence, the medical man's assistance may be called. The sex of the skeleton, if that only be found, may be judged from the bones of the female generally being smaller and more slender than those

of the male, by the female thorax being deeper, the costal cartilages longer, the ilia more expanded, the sacrum more concave, the coccyx movable, turned back, and the tuberosities of the ischia wider apart, the pubes shallow, and the whole pelvis shallower and with larger outlets. Age may be calculated from the cartilages of the ribs, which ossify as age advances; from the skull, incomplete ossification of which is evidence of childhood; and from the condition of the epiphyses generally, with regard to their attachment to their respective shafts. In determining statue, if the whole skeleton be laid out and 1 1-2 to 2 inches allowed for the soft parts, a fair estimate may be made. With regard to the determination of cases of doubtful sex in the living, the following points should be noticed: the size of the penis or clitoris, and whether perforate or not, the form of the prepuce, the presence or absence of nymphæ and testicles. Openings must be carefully sounded as to their communication with bladder or uterus; inquiry should be made as to menstrual or vicarious discharges, and the general development of the body, the growth of the hair, the tone of voice, and the behaviour of the individual towards either sex carefully noted.

Impotence and Sterility.—In the *male*, impotence may arise from physical or mental causes. The physical causes are: too great or too tender an age; malformation of the genital organs; defect or disease in the testicles; constitutional disease or debility. Masturbation, and early and excessive sexual indulgence are also causes. The mental causes include: passion, timidity,

apprehension, aversion, and disgust. In the *female*, impotence may be caused by narrowness of the vagina; adhesion of the vulva; absence of vagina; imperforate hymen; and tumors of vagina. Sterility in women may occur from the above-named causes of impotence, or from great debility, constant amenorrhœa, dysmenorrhœa or menorrhagia.

Rape.—Rape is defined as "the carnal knowledge of a woman against her will." To constitute rape there must be *penetration*, but proof of actual emission of seed is unnecessary. Physical signs: in the adult the hymen may be ruptured, the fourchette lacerated, and blood found on the parts; in a child there may be no hæmorrhage, but there will be signs of bruising on the external organs, with probably considerable laceration of the hymen. The patient will have difficulty in walking, and in passing water and fæces. These signs last longer in children than in adults. There may be scratches and ecchymoses on the abused person, showing evidence of a struggle. Semen may be found on the linen of the woman and man, and will be recognised under the microscope by the presence in it of spermatozoa, minute filamentary bodies with a pear-shaped head.

Pregnancy.—The signs of the existence of pregnancy are of two kinds, uncertain and certain. Amongst the former class are included: cessation of menstruation, morning sickness, salivation, enlargement of the breasts and of the abdomen, quickening, and the occurrence of kiestein in the urine. The tests which afford conclusive evidence of the existence of a fœtus in the uterus, are:

ballottement, the uterine soufflé, and above all the pulsation of the fœtal heart. Evidence of pregnancy may also be afforded by the discharge from the uterus of an early ovum, or moles, hydatids, &c.

Delivery.—The signs of recent delivery are as follows: the face is pale, with dark circles round the eyes, the pulse quickened, the skin soft, warm, and covered with a peculiar sweat, the breasts full, tense and knotty, the abdomen distended, its integuments relaxed, with irregular light streaks on the lower part; the labia and vagina show signs of distension and injury; for the first three or four days there is a discharge from the uterus, more or less bloody in character; during the next four or five days it becomes of a dirty green color, and in a few days more of a yellowish, milky, mucous character continuing for four or five weeks. The uterus may be felt for two or three days above the pubis as a hard round ball. Most of these signs disappear about the tenth day. In the *dead*, the external parts have the same appearance as given above. The uterus will vary in appearance according to the time elapsed since delivery. If death occurred immediately after delivery, the uterus will be wide open, about 9 or 10 inches long, with clots of blood inside, and its inner surface lined by decidua. The signs of a *previous delivery* consist in silvery streaks in the skin of the abdomen, which however may be due to distension from other causes; similar marks on the breast, jagged condition of the os uteri, marks of rupture of the perineum or fourchette, dark colored areola round the nipples, &c.

Fœticide, or Criminal Abortion.—This consists in giving to any woman, or causing to be taken by her, with intent to procure her miscarriage, any poison or other noxious thing, or using for the same purpose any instruments or other means whatsoever; also in the use of the same means, with the same intent, by any woman, being with child. It is not necessary that the woman be *quick* with child. "The offence is the intent to procure the miscarriage of any woman, *whether she be or be not with child.*" In medicine, an *abortion* is meant when the fœtus is expelled before the sixth month; after that it is *premature birth.* In law, however, an expulsion of the uterus before the full time is an *abortion* or *miscarriage.* In deciding whether any substance expelled from the uterus is really a fœtus, or is only a mole, or the coat of the uterus, and unconnected with pregnancy, the examination of the woman will be of help; though it is not easy to say whether abortion has taken place or not. The history must be inquired into, and state of the breasts, the hymen and the os uteri carefully examined. Abortion may be procured by the introduction of instruments, by violent blows, &c., or by the administration of certain drugs, as ergot, savin, pennyroyal, &c.

Infanticide.—Infanticide is not treated as a special crime, but is tried by the same rules as in cases of felonious homicide. To constitute "live birth," the child must have been alive after its body was entirely born, and must have had an independent circulation, though this does not imply the severance of the umbilical cord. With regard to the question of maturity of a child, the

differences between a child of six or seven months and one at full term may be stated as follows:

Between sixth and seventh month: length of child, 10 to 14 inches. Weight, 1 to 4 lbs. Skin, dusky red, covered with down and sebaceous matter; membrana pupillaris disappearing; nails not reaching to ends of fingers; meconium at upper part of large intestine; testes near kidneys; no appearance of convolutions in brain; points of ossification in four divisions of sternum. At nine months: length of child, 16 to 20 inches. Weight, 4 lbs. 5 ozs. to 7 lbs. Skin rosy, down about shoulders; sebaceous matter on body; hair about an inch long on head; testes past inguinal ring; membrana pupillaris disappeared; nails reach to ends of fingers; meconium at termination of large intestine; points of ossification in centre of cartilage at lower end of femur.

Evidences of Live Birth.—The signs of live birth, prior to respiration, are divided into negative and positive. A negative opinion may be formed when evidence is found of the child having undergone intra-uterine maceration. In this case the body will be flaccid and flattened; the ilia prominent; the head soft and yielding; the cuticle more or less detached; the skin of a whitish or brownish-red color, covered with a soapy fluid; the cavities filled with abundant bloody serum; the umbilical cord straight and flaccid. A positive opinion may be justified when such injuries are found on the body as could not have been inflicted during birth, and attended with such hæmorrhage as could only have occurred while the blood was circulating. The evidences of *live birth*,

after respiration has taken place, are usually deduced from the condition of the lungs; though signs are also found in some of the other organs. The lungs, before respiration, are situated at the back of the thorax, not filling that cavity; after respiration they occupy the whole thorax; the portions containing air are of a light-red color, becoming scarlet, and crepitate under the finger. The weight of the lungs before respiration is about 874 grains; afterwards, 1195 grains: this test, however, is of little use. The ratio of the weight of the lungs to that of the body (Ploucquet's test), which is also but little to be relied on, is, before respiration, about 1 to 80; after, 1 to 40. Lungs in which respiration has taken place float in water: those in which it has not, sink. There are exceptions to this rule, on which, however, is founded the hydrostatic test. As originally performed, this consisted merely in placing the lungs, with or without the heart, in water, and noticing whether they sank or floated. This test is now modified by pressure, and by cutting the lungs up into pieces.

The objections to this test, as originally performed, were:—1. That the lungs may sink as the result of disease, *e.g.*, double pneumonia. 2. That respiration may have been so limited in extent that the lungs may sink. 3. Putrefaction may cause the lungs to float when respiration has not taken place. 4. The lungs may have been inflated artificially. Few of these objections apply, however, when the hydrostatic test, modified by pressure, is employed. To apply this, the pressure of the finger and thumb under water may be sufficient; if not, the fragment may be placed in a cloth and the ends twisted

opposite ways; if still further pressure be required, the cloth containing the lung may be trodden by the foot.

In addition to the hydrostatic test, live birth may be deduced from the following conditions:—The *stomach* may contain milk or food, recognised by the microscope and by Trommer's test for sugar; the *large intestines* in still-born children are filled with meconium; in those born alive they are usually empty; the *bladder* is generally emptied soon after birth; the *skin* is in a condition of exfoliation soon after birth. The *organs of circulation* undergo the following changes after birth, and the extent to which they go will give an idea of how long the child has lived:—The *ductus arteriosus* begins to contract within a few seconds of birth; at the end of a week it is about the size of a crowquill, and about the tenth day is obliterated. The *umbilical arteries and vein*:—The arteries are markedly diminished in calibre at the end of twenty-four hours, and obliterated almost up to the iliacs in three days; the umbilical vein and the ductus venosus are generally completely contracted by the fifth day. The *foramen ovale* becomes obliterated at extremely variable periods, and may continue open even in the adult.

The umbilical cord in a new-born child is fresh, firm, round, and bluish in color; blood is contained in its vessels. The changes are as follows:—first it *shrinks* from the ligature towards the navel; this change may begin early, and is rarely delayed beyond thirty hours; the cord becomes flabby, and there is a distinct inflammatory circle round its insertion. The next change is that of *desic-*

cation: the cord becomes reddish-brown, then flattened and shrivelled, then transparent and of the color of parchment, and falls off about the fifth day. The third stage, that of *cicatrization*, then ensues, about the tenth to the twelfth day. The bright red rim about the insertion of the cord, with inflammatory thickening and slight purulent secretion, may be considered as positive evidence of live birth.

Cause of Death in the Fœtus.—The death of the fœtus may be due to, 1. Its immaturity. 2. Complications occurring during or immediately after birth, which may either be unavoidable or inherent in the process of parturition, or may be induced with criminal intent. Under the former category come such accidents as the pressure of tumors in the pelvic passages, or disease of the bone in the mother, or pressure on the cord from malposition during labor, by strangulation, from the funis being round the neck, or falls on the floor in sudden labours. Where the death of the fœtus has been induced with criminal intent, it may be due to punctured wounds of the fontanelles, orbits, heart, or spinal marrow; dislocation of the neck; separation of the head from the body; fracture of the bones of the head and face; strangulation; suffocation; drowning; poisoning; or omission to tie the umbilical cord.

Legitimacy.—A child born in wedlock is presumed to have the mother's husband for its father. This may, however, be open to question upon the following grounds: Absence or death of the reputed father; impotence or disease in the husband preventing matrimonial inter-

course; premature delivery in a newly-married woman; want of access; when the woman marries again immediately on the death of her husband.

Duration of Pregnancy.—The natural period of gestation is considered as forty weeks, ten lunar months, nine calendar months, or 280 days. In Scotland ten months is held as the limit. This period, however, is not unfrequently exceeded, and, on the other hand, the child may be born at a shorter term. There is considerable difficulty in many cases in fixing the date of conception. The data from which it is calculated are the following:—1. *Peculiar sensations attending conception*, which are not sufficiently defined to be recognized by those conceiving for the first time. 2. *Cessation of the catamenia.* Other causes may, however, cause this; and on the other hand, a woman may menstruate during the whole period of her pregnancy. This datum also gives a variable period, and may involve an error of at least twelve days. 3. *The period of quickening.* This, when perceived (which is not always the case), also occurs at variable periods from the tenth to the twenty-sixth week. 4. *A single coitus.* This, which is the only really accurate mode of reckoning, is, of course, seldom available.

Viability of Children.—Seven months, or 210 days, is generally considered as the earliest period at which a child can be born capable of living and attaining to maturity. Cases, however, have been recorded in which children born at six months have been reared. The signs of immaturity and maturity are thus tabulated:

IMMATURITY.	MATURITY.
Centre of body high; head disproportionate in size; the membrana pupillaris present; testicles undescended; deep red color of parts of generation; intense red color, mottled appearance, and downy covering of skin; nails not formed; feeble movements; inability to suck; necessity of artificial heat; almost unbroken sleep; rare and imperfect discharges of urine and meconium; closed state of mouth, eyelids and nostrils.	Strong movements and cries as soon as born; body clear, red color, coated with sebaceous matter; mouth, nostrils, eyelids and ears open; skull somewhat firm, and fontanelles not far apart; hair, eyebrows and nails perfectly developed; testicles descended; free discharge of urine and meconium; power of suction, indicated by seizure of the nipple or a finger placed in the mouth.

Inheritance.—In order to inherit, the child must be born alive; must be born during the lifetime of the mother; must be born capable of inheriting—that is to say monsters are incapable of inheriting. There is a mode of inheritance called "tenancy by the curtesy," as follows: "When a man marries a woman seized of an estate of inheritance, and has, by her, issue born alive, which was capable of inheriting her estate: in this case he shall, on the death of his wife, hold the lands for his life as tenant by the curtesy of England." The meaning of the words "born alive" in this instance is not the same as in cases of infanticide—any kind of motion being held as evidence of live birth in questions of tenancy by curtesy.

Feigned Diseases.—The following hints may be useful to a medical man when called to what he believes to be a case of malingering:—Do not be satisfied with one visit only, but come once again and enter unannounced; see that the patient is watched between the visits; examine each organ separately, compare its con-

dition with the statement of the patient, and note any discrepancies between his account of his symptoms and the real symptoms of disease; ask questions the reverse of the patient's statements, or take them for granted, and he will often be found to contradict himself; have all dressings aud bandages removed; suggest, in the hearing of the patient, some heroic methods of treatment,—the actual cautery, or some severe surgical operation, for example; chloroform will be found of great use in the detection of many sham diseases.

Mental Unsoundness.—According to English law, madness absolves a criminal from all guilt; but in order to excuse from punishment on this ground it must be proved that the individual was not capable of distinguishing right from wrong, and that he did not know at the time of committing the crime that the offense was against the laws of *God* and *nature*.

Under the term *non compos mentis* four classes were included by Lord Coke, viz.: 1. *Idiota*, which from his nativity, by a perpetual infirmity, is *non compos mentis*. 2. He that, by sickness, grief, or other accident, wholly loseth his memory and understanding. 3. A lunatic that hath sometimes his understanding and sometimes not, *aliquando gaudet lucidis intervallis*, and, therefore, he is called *non compos mentis*, so long as he hath not understanding. 4. He that, by his own vicious act for a time depriveth himself of his memory and understanding, as he that is drunken.

Various systems of classification have been adopted at the suggestion of different authorities. One well suited

for our purpose is that adopted by Dr. Guy, in his "Forensic Medicine," which is as follows:

UNSOUNDNESS OF MIND.

- *I. Amentia:*
  1. Idiocy.
  2. Imbecility.
  3. Cretinism.
- *II. Dementia:*
  1. Acute, or Primary.
  2. Chronic, or Secondary.
  3. Senile Dementia.
  4. Paralytic Dementia, or General Paralysis of the Insane.
- *III. Mania:*
  1. General.
  2. Intellectual
     - General.
     - Partial
       - Monomania.
       - Melancholia.
  3. Moral
     - General.
     - Partial
       - Homicidal.
       - Suicidal, etc., etc.

1.—*Idiocy* is a congenital condition in which the intellectual faculties are either never manifested, or have not been sufficiently developed to enable the idiot to acquire an amount of knowledge equal to that acquired by other persons of his own age and in similar circumstances with himself. Idiots, as a rule, are deformed in body as well as deficient in mind. Their heads are generally small and badly shaped, and their features ill-formed and distorted. The complexion is sallow and unhealthy; the limbs imperfectly developed, the gait is awkward, shambling and unsteady. In his legal relations an idiot is civilly disabled and irresponsible.

Imbecility is a form of mental defect not generally congenital, but commencing in infancy. The line of demarcation between the imbecile and the idiot may be found in the possession by the former of the faculty of speech, in distinction from the more parrot-like utterance of a few words which can be taught the idiot. Imbecility may be intellectual, moral or general.

Cretinism is a form of amentia which is epidemic in certain districts, especially in some of the valleys of Switzerland, Savoy and France. The malady is not congenital, but its symptoms usually appear within a few months of birth. The characteristics of this form of idiocy are an enlarged thyroid gland, constituting a goitre or bronchocele, a high-arched palate, dwarfed statue, squinting eyes, sallow complexion, small legs, conical head, large mouth and indistinct speech.

II.—In Dementia, the mental aberation does not occur until the mind has become fully developed, thus differing from amentia, which is congenital, or comes on very early in life.

Acute Dementia.—This is a condition of profound melancholy or stupor, which arises from sudden mental shock, the mind being, as it were, arrested and fixed in abstraction on the event.

Chronic Dementia is generally caused by the gradual action on the mind of grief or anxiety, by severe pain, mania, apoplexy, paralysis, or repeated attacks of epilepsy.

Senile Dementia is a form which is incidental to aged persons; it commences gradually, with such symptoms as loss of memory for recent events, dulness of perception,

and inability to fix the attention. Later on, the reasoning powers begin to fail, and finally memory, reason, and power of attention are quite lost, the muscular power and force remaining intact. In the last stage there is simply bare physical existence.

Paralytic Dementia, or general paralysis of the insane, is a most interesting form of dementia. Its most prominent and characteristic symptom consists in delusions of great power, exalted position and unlimited wealth. It is accompanied by progressive bodily and mental decay. Women are rarely affected by it, and it generally commences in men about middle age, and lasts from a few months to three years. Paralytic symptoms first appear in the tongue, lips and features; the speech becomes thick and hesitating. The paralytic symptoms gradually go on increasing, the sphincters refuse to act, and death may occur from suffocation and choking. Sometimes, during the earlier stages especially, there may be maniacal paroxysms or epileptic fits. The delusions remain the same throughout, the patient alway expresses himself as being happy, and his last words will probably have reference to money and his other large delusions.

III.—Under the term mania are included all those forms of mental unsoundness in which there is undue excitement. It is divided into general, intellectual, and moral, and each of the two latter classes again into general and partial.

General Mania affects the intellect as well as the passions and emotions. Mania is usually preceeded by an incubative period in which the patient's general health is affected. The duration of this period may vary from a

few days to fifteen or twenty years. When the disease is established, the patient has paroxysms of violence, directed against himself as well as others; he tears his clothes to pieces, either abstains from food and drink or eats voraciously, and sustains immense muscular exertion without apparent fatigue. The face becomes flushed, the eyes wild and sparkling; there is pain, weight and giddiness in the head, with restlessness.

General Intellectual Mania, attacking the intellect alone, is rare; but some one emotion or passion, as pride, vanity, or love of gain, may obtain ascendancy, and fill the mind with intellectual delusions.

Partial Intellectual Mania or "monomania," also called "melancholia," is a form of the disease in which the patient becomes possessed of some single notion, contradictory alike to common sense and his own experience.

General Moral Mania.—Pritchard thus defines moral mania: "A morbid perversity of the natural feelings, affections, temper, habits, moral disposition and natural impulses, without any remarkable disorder or defect of the intellect or knowing and reasoning faculties, and particularly without any insane illusion or hallucination."

Partial Moral Mania.—In this form one or two only of the moral powers are perverted. There are several forms of this, viz:

Kleptomania, a propensity to theft. More common in women in easy circumstances.

Dipsomania, an insatiable desire for drink.

Erotomania, or amorous madness. When occurring in women this is also called *Nymphomania*, and in men

Satyriasis, It consists in an uncontrollable desire for sexual intercourse.

Pyromania, an insane impulse to set fire to everything.

Homicidal Mania, a propensity to murder.

Suicidal Mania, or propensity to self-destruction. Some consider suicide always a manifestation of insanity.

Puerperal Mania.—This form of mania attacks women after childbirth. There is in many cases a strong homicidal tendency against the child.

Mania with Lucid Intervals.—In many cases mania is intermittent or recurrent in its nature, the patient in the intervals being in his right mind.

Examination of Persons of Unsound Mind.—The general appearance and shape of the head, complexion and expression of countenance, gait, movements, and speech should be carefully noted. The state of the general health, appetite, bowels, tongue, skin, and pulse should be inquired into; and in woman the state of the menstrual function must be noticed. The family history must be traced out, and the personal history taken with care, as to whether the unsoundness came on late in life or followed any physical cause. Ascertain whether this is the first attack, whether the patient has suffered from epilepsy, squandered his money, grown restless, had large delusions, etc., etc. In order to ascertain the capacity of the mind, questions should be asked with regard to age, birth-place, profession, number of family, common events, day of week, month and year, name of sovereign, &c. The power of performing simple arithmetical operations may be tested. More than one visit should be made.

In a lunacy certificate, except in the case of a pauper patient, there are required the signatures of two independent medical men, of a relation or a friend. The medical men must make separate visits, at different times, and write on the proper forms the facts observed by themselves and those observed by others, giving the name of the informer. A certificate is valid only for seven days.

Examination of Persons Found Dead.—When a medical man is called to a case of sudden death he should carefully note anything likely to throw any light on the cause of death. He should also notice the place where the body was found, the position and attitude of the body, the soil or surface on which the body lies, the position of surrounding objects, and the condition of the clothes.

If required to make a post-mortem examination, follow rules given on another page.

Modes of Sudden Death.—There are three modes in which death may occur,—by syncope, asphyxia, and coma.

Syncope, or arrest of the heart's action, may occur from, 1. Deficiency of blood, due to hæmorrhage. 2. The effects of certain diseases and poisons. The P. M. signs of this mode of death are, a normal quantity of blood in the heart; blood in the veins and arteries; no engorgement of brain and lungs.

Asphyxia, or *apnœa*, death from impediment to the action of the lungs, caused by—1. Certain diseases of the lungs. 2. Mechanical obstruction to respiration. P. M. shows engorgement of the pulmonary artery, right

cavities of heart and venæ cavæ, the left side of the heart and the aorta, etc., being comparatively empty.

Coma.—Death due to some cerebral mischief, caused by apoplexy, fracture of the cranial bones, compression, etc. The P. M. signs are congestion of the membranes and substance of the brain and lungs, with more or less blood in the right cavities of the heart.

Signs of Death.—*1. Cessation of the Circulation and Respiration*, no murmur being heard by the stethoscope. *2. The state of the Eye*, in which there is a tenacious, glairy mucus on the conjunctiva, with a collapsed and wrinkled state of the cornea. *3. Absence of Sense and Motion;* these occur in suspended animation. *4. The facies Hippocratica*—not a safe sign, being frequently absent in sudden death. *5. The state of the Skin:* pallor, livid discolorations and loss of elasticity have been mentioned among the signs of death. *6. Extinction of Muscular Irritability.*

The above signs afford no means of determining how long life has been extinct. The following, however, do:

Extinction of Animal Heat; the average internal temperature of the body is from 98° to 100° F.; the time taken in cooling is from 15 to 20 hours, but it may be modified by circumstances. *Cadaveric Rigidity—Rigor Mortis:* for some time after death the muscles continue to contract under stimulus; when this irritability ceases—and it seldom lasts more than two hours—rigidity sets in. It is caused by the coagulation of the muscle fibrin. It commences in the muscles of the back of the neck and lower jaw, and then passes into the muscles of the face, front

of the neck, chest, upper extremities and, lastly, the lower extremities. It lasts from 16 to 20 hours, or more. In lingering diseases it sets in quickly, and disappears in two or three hours; in those who are in perfect health, and die from accident, it does not come on for from 10 to 12 hours, and may last two or three days. This is also the case in poisoning by strychnia.

Putrefaction appears in from one to three days after death, as a greenish-blue discoloration of the abdomen. This increases, becoming darker and more general, a strong putrefactive odor is developed, the thorax and abdomen become distended with gas, and the epidermis peels off. The muscles then become pulpy and assume a dark greenish color, the whole body at length becoming changed into a soft, semi-fluid mass. The organ which resists putrefaction longest is the uterus. These putrefactive changes are modified by the fat or lean condition of the body, the temperature (putrefaction taking place more rapidly in summer than in winter), access of air, the period, place, mode of interment, age, etc. Bodies which remain in water putrefy more slowly than those which remain in air.

Saponification. In bodies which are very fat and have lain in water or moist soil for from one to three years, this process takes place, the fat uniting with the ammonia given off by the decomposition to form *Adipocere.* This consists of a margarate of ammonia, with lime, oxide of iron, potash, certain fatty acids, and a yellowish odorous matter. It has a fatty, unctuous feel, is either pure white or pale yellow, with an odor of decayed cheese.

Death by Drowning.—Death by drowning occurs when breathing is arrested by watery or semi-fluid substances, blood, urine, mud, &c. The fluid acts mechanically by entering the air-cells of the lung and preventing the due oxidation of the blood. The post-mortem appearances include those usually present in death by apnœa (asphyxia), and also the following, peculiar to death by drowning: Excoriations of the fingers, with sand or mud grasped in the nails; fragments of plants grasped in the hand; water in the stomach (this is a vital act, and shows that the person fell into the water alive); froth at the mouth and nostrils; froth, water, and sand, or mud, in the air passages; cutis anserina, and contraction and retraction of the penis. The last is a very constant and valuable sign.

Death by Hanging.—In hanging, death occurs by apnœa, as in drowning; or from the force of the fall dislocating or fracturing the cervical vertebræ, or the odontoid process. Sensibility is soon lost in hanging, and death is complete in four or five minutes. The eyes are brilliant and staring, tongue swollen and livid, blood or bloody froth is found about the mouth and nostrils, the hands are clenched, a deep and ecchymosed mark shows the course of the cord, which in hanging is obliquely round the neck, but straight round in strangulation, and on dissection, the muscles and ligaments of the windpipe are found stretched, bruised or torn, and the inner coats of the carotid arteries are sometimes found divided.

Death by Strangulation.—This differs from hanging, in that the body is not suspended. It may be

effected by a ligature round the neck, or by direct pressure on the windpipe. In strangulation more force is required to be used, and therefore the mark on the neck will be more distinct, and the injury to the subjacent parts greater.

Death by Suffocation.—This includes all cases of apnœa not produced by direct pressure on the windpipe, except drowning. Suffocation may take place from: 1. Stoppage of the mouth and nose by accident or force. 2. Mechanical pressure on the chest. 3. Closure of the glottis, as by food. 4. Vapors, as the vapor of charcoal. 5. Strychnia, which, by contracting the muscles of the chest, produces death by suffocation.

In some cases of death by suffocation there are no external marks; but internally there are the signs of asphyxia, with unusual fluidity of the blood.

Wounds and Mechanical Injuries.—A wound may be defined, according to Dr. Taylor, as "a breach of continuity in the structures of the body, whether external or internal, suddenly occasioned by mechanical violence." This large subject of wounds will be considered under various heads.

Contused Wounds and Injuries Unaccompanied by Solution of Continuity.—If a blow be inflicted with a blunt instrument, there is produced a bruise or *ecchymosis*, of which it is unnecessary here to describe the appearance and progress. A bruise may be distinguished from a post-mortem stain, by the former not being confined to the cellular membrane, but involving the substance of the true skin. It may be required to distingish between bruises inflicted during

life and after death. In bruises inflicted during life the skin is dark, discolored, and thickened by the infiltration of blood into its whole thickness. If on cutting into the bruise, the effusion of blood is considerable and the clots large, the presumption is strongly in favor of its having been inflicted during life.

Incised Wounds and those Accompanied by Solution of Continuity.—These comprise incised, punctured and lacerated wounds. In a recent incised wound, inflicted during life, there is copious hæmorrhage, the cellular tissue is filled with blood, the edges of the wound are united, with coagula between. The distinction between incised wounds inflicted during life and after death, may be found in the fact, that in a wound inflicted during life, there are the above characters; whereas, in a post-mortem incised wound, a small quantity of liquid venous blood is effused: no clots are found; the edges are closed, yielding, inelastic; the blood is not effused into the cellular tissue, and there are no signs of inflammation.

Lacerated wounds combine the characters of incised and contused wounds.

Punctured wounds come intermediate between incised and lacerated. They cause little hæmorrhage, and heal usually by suppuration.

Gunshot Wounds.—These are either contused or lacerated wounds. Round balls make a larger opening than conical ones. Small shot, if fired near, make one large, ragged opening. The contents of all gunshot wounds should be preserved, as they may be useful in

evidence. When the bullet traverses the body, two apertures will be found. The aperture of entrance is round and clean; that of exit less regular, jagged, and always *smaller* than that of entrance. (Casper.)

Wounds of Different Parts of the Body.

1. *Of the Head.*—Wounds of the scalp are particularly likely to cause erysipelatous or diffuse inflammation. A severe blow on the vertex may cause fracture of the base of the skull. Injuries to the brain include concussion, compression, wounds and inflammation. Concussion is a common effect of blows or violent shocks, and the symptoms follow immediately on the accident; death sometimes takes place without reaction. Compression may be caused by depressed bone or effused blood and serum. The symptoms may come on suddenly or gradually. Wounds of the brain present very great difficulties, and vary greatly in their effect, very slight wounds producing severe symptoms, and *vice versâ*. Inflammation may follow injuries, not only to the brain itself, but the scalp and adjacent parts, as the orbit and ear. Inflammation does not usually come on at once, but after a variable period.

2. *Injuries to the spinal-cord* may be by concussion, compression or wounds. Serious injury to the cord generally proves fatal immediately, or speedily if in the upper part, by paralysis of the muscles of respiration. If the injury be in the lumbar or dorsal region, there is loss of power and sensation below the seat of the injury, with retention of urine and escape of fæces.

3. *Of the face.*—These produce great disfigurement and inconvenience, and there is a risk of injury to the brain.

4. *Of the throat.*—Very frequently inflicted by suicides. Division of the carotid artery is fatal, and of the internal jugular vein very dangerous. Wounds to the larynx and trachea are little dangerous.

5. *Of the chest.*—Incised wounds of the walls are not very dangerous; but severe blows, by causing fracture of the bones and internal injuries, are often fatal.

6. *Of the lungs.*—These cause hæmorrhage and inflammation very frequently.

7. *Of the heart.*—Penetrating wounds are fatal from hæmorrhage, and of the base more speedily than of the apex.

8. *Of the aorta and pulmonary artery.*—Fatal.

9. *Of the œsophagus and thoracic duct.*—Very rare.

10. *Of the diaphragm.*—Generally dangerous, from hernia of the stomach.

11. *Of the abdomen.*—Of the walls may be dangerous from division of the epigastric artery; ventral hernia may occur.

12. *Of the liver.*—May divide the large vessels. Wounds of the gall-bladder cause effusion of bile and peritoneal inflammation.

13. *Of the spleen.*— Deep wounds are fatal from hæmorrhage.

14. *Of the stomach.*—May be fatal from shock, from hæmorrhage, from extravasation of contents, or from inflammation.

15. *Of the intestines.*—May be fatal in the same way as those of the stomach. More dangerous in the small than in the large intestines.

16. *Of the kidneys.*—May prove fatal from hæmorrhage, extravasation of urine, or inflammation.

17. *Of the bladder.*—Dangerous from extravasation of urine.

18. *Of genital organs.*—Removal of penis may produce fatal hæmorrhage; if not, it is not dangerous. Removal of testicles may prove fatal from shock to nervous system. Wounds of the spermatic cord may be dangerous from hæmorrhage.

Death from Starvation.—The post-mortem appearances in death from starvation are as follows: There is marked general emaciation; the skin is dry and shrivelled; the muscles soft, small, and free from fat; the liver is small, but the gall-bladder is distended with bile. The heart, lungs and internal organs are shrivelled and bloodless. The stomach is sometimes quite healthy; in other cases it may be collapsed, empty, and with more or less ulceration of the mucous membrane. The intestines are also contracted and empty, and may be so much shrunken that the canal may be almost obliterated.

Dr. Guy says: These appearances are not so characteristic as to be decisive of the mode of death; but, in the absence of any disease productive of extreme emaciation, such a state of body will furnish a strong presumption of death by starvation.

TOXICOLOGY.

A poison is any substance or matter (solid, liquid or gaseous) which, when applied to the body, outwardly, or in any way introduced into it, without acting mechanically, but by its own inherent qualities, can destroy life.

Various attempts have been made to devise a satisfactory system of classification, but without much success. The following is that adopted by Dr. Guy:

1. INORGANIC: Corrosive, irritant.
2. ORGANIC: Irritant, affecting brain, affecting spinal cord, affecting heart, affecting lungs.

The most important poisons of these two classes are: *Inorganic*—arsenic, salts of lead, mineral acids, salts of mercury. *Organic*—opium and its preparations (as laudanum, morphia, and Godfrey's cordial), prussic acid, oil of bitter almonds, cyanide of potassium, oxalic acid, strychnia and nux vomica.

It may be inferred poison has been taken by a person from an examination of the following circumstances: Symptoms and post-mortem appearances, experiments on animals, chemical analysis, and the conduct of suspected persons.

1. *Symptoms*, in poisoning, usually come on suddenly, when the patient is in good health, and soon after taking a meal, drink or medicine; many diseases, however, come on suddenly, and in cases of slow poisoning, the invasion of the symptoms may be gradual. 2. *Post-Mortem Appearances.*— These, in many poisons and classes of poisons, are perfectly characteristic and unmistakable. 3. *Experiments on Animals.*— These are valuable, but they cannot always be taken as conclusive. The dog and the cat are the animals most nearly resembling man with respect to the effects produced by poisons. 4. *Chemical Analysis.*—This is, perhaps, the most important form of evidence, as a demonstration of the actual presence of a poison in the body must carry immense weight. The poison may be discovered in the living person by testing the urine, the blood abstracted by bleeding, leeching or cupping, or the serum of a blister. In the dead body it may be found in the blood, flesh, viscera and secretions. Its discovery in these cases must be taken as conclusive evidence of administration. If, however, it be found only in substances rejected or voided from the body the evidence is not so conclusive, as it may be contended that the poison was introduced into the substance examined after its rejection from the body, or if the quantity be very small it will be argued that it is not sufficient to cause death. 5. *Conduct of Suspected Persons.*—A prisoner may be proved to have purchased poison, to have made a study of the properties and effects of poisons, to have made medicines or prepared food for the diseased, to have made himself the sole attendant of the diseased, to have placed obstacles in the way of obtaining proper

medical assistance, to have removed substances which might have been examined, etc.

SYMPTOMS AND POST-MORTEM APPEARANCES OF DIFFERENT CLASSES OF POISONS.

1. Corrosives.—Characterized by their destructive action on parts with which they come in contact. The principal inorganic corrosives are the mineral acids, the caustic alkalies and their carbonates; the organic, strong solutions of oxalic acid, and of tartaric and citric acid.

Symptoms.—Burning pains in mouth, throat and gullet; strong acid, metallic or alkaline taste; retching and vomiting, the discharged matters containing shreds of mucus, blood, and the lining membrane of the passages. Inside of mouth corroded. There is also dysphagia, thirst, dyspnœa, small and frequent pulse, anxious expression, etc.

Post-Mortem Appearances.—Those of corrosion with corrugation from strong contraction of muscular fibres, and followed by inflammation and its consequences. The mouth, gullet and stomach, and, in some cases, the intestines, are white, yellow and brown, shrivelled and corroded. The corrosion may be small, or may extend over a very large surface. Sometimes considerable portions of the lining membrane of the gullet or stomach may be discharged by vomiting or by stool. Beyond the corroded parts the textures are acutely inflamed. The stomach is filled with a yellow, brown or black gelatinous liquid or black blood, and may in rare cases be perforated.

2. Irritants.—These are substances which inflame parts to which they are applied. The class includes mineral, animal and vegetable substances, and contains a larger number of poisons than all the other classes together. Irritants may be divided into two groups: 1. Those which destroy life by the irritation they set up in the parts to which they are applied. 2. Those which add to local irritation peculiar or specific remote effects. The first group includes the principal vegetable irritants, some alkaline salts, some metallic poisons, &c.; and the second comprises the metallic irritants, the metalloids, phosphorus and iodine, and one animal substance, cantharides.

Symptoms.—Burning pain and constriction in throat and gullet; pain and tenderness of stomach and bowels, intense thirst, nausea, vomiting, purging and tenesmus, with bloody stools; dysuria, cold skin and feeble and irregular pulse. Death may occur from shock, convulsions, collapse, exhaustion, or from starvation on account of the injury to the œsophagus.

Post-mortem appearances.—Those of inflammation and its consequences. Coats of stomach, fauces, gullet, and duodenum may be thickened, black, ulcerated, gangrenous and sloughing. Vessels filled with dark blood ramify over the surface. Acute inflammation is often found in the small intestines with ulceration and softening of mucous membrane.

3. Poisons acting on the brain.—Three classes: the opium group, producing sleep; the belladonna group, producing delirium and illusions; and the alcohol

group, causing exhilaration followed by delirium or sleep.

Symptoms.—Of the *opium* group: giddiness, headache, dimness of sight, contraction of pupil, noises in the ears, drowsiness and confusion, passing into insensibility. Of the *belladonna* group: delirium, spectral illusions, dilated pupils, dry mouth, thirst. Rarely there may be tetanic spasms, paralysis, &c. Of the *alcohol* group: excitement of circulation and of cerebral functions, want of power of co-ordination, and of muscular movement, double vision, followed by profound sleep and coma. In the chronic form, delirium tremens.

Post-mortem appearances.—In the opium group: fulness of the sinuses and veins of the brain, with effusion of serum into the ventricles and beneath the membranes. In the belladonna group: nil. In the alcohol group: signs of inflammation, congestion of brain and membranes, fluidity of blood, long-continued rigor mortis.

4. Poisons acting on the spinal cord.—Strychnia, &c. The leading symptom is tetanic spasm.

5. Poisons affecting the heart.—These kill by sudden shock, syncope, or collapse. They comprise, prussic acid, oxalic acid and the oxalates, aconite, digitalis, tobacco, &c.

6. Poisons acting on the lungs.—These have for their type, carbonic acid gas.

HINTS TO THE PHYSICIAN.

If called to a case supposed or suspected to be one of poisoning, the medical man has two duties to perform:

to save the patient's life, and to assist justice. If he find life extinct, his duty is only to see that justice is done. For this purpose he makes inquiries as to symptoms, time at which food or medicine was last taken, &c. He must take possession of any food, medicine, vomited matter, urine or fæces in the room, and seal them up in clean vessels for examination. He must then notice the position and temperature of the body, the condition of rigor mortis, marks of violence, appearance of gullet and mouth, and in making a post-mortem examination, the alimentary canal must be removed and preserved for further investigation. A double ligature should be passed round the œsophagus in the chest, and also round the duodenum a few inches below the pylorus. The gut and the gullet being cut across between these ligatures, the stomach may be removed entire without spilling the contents. The intestines may be removed in a similar way, and the whole or a portion of the liver should also be preserved. These should all be put in separate jars without any preservative fluid, tied up, sealed, labelled, and initialed. All observations should be committed as soon as possible to writing.

TREATMENT FOR POISONING.

The modes of treatment may be ranged under three heads. 1. To get rid of the poison. 2. To stop its action. 3. To avert the tendency to death.

1. The first indication is met by the administration of emetics, to cause vomiting, or by the use of the stomach-pump. It will be seen further on in what cases respec-

tively these two methods are admissible. Of emetics, *sulphate of zinc* in twenty grain doses is about the best. In narcotic poisoning *sulphate of copper* in eight or ten grain doses will sometimes act when other emetics have failed. *Ipecacuanha wine* (drachms six to eight) is sometimes useful. A teaspoonful or two of *mustard* in warm water frequently repeated is often an efficient substitute for the above, as is *common salt* occasionally. Tickling the fauces with a feather will also excite vomiting.

2. The second indication is met by the administration of an antidote. The various antidotes will be mentioned below their respective poisons.

3. To avert the tendency to death we must endeavor to palliate the symptoms, and neutralise the after-effects of the poison on the constitution. In the case of narcotics and depressing agents, stimulants, galvanism, cold affusion, &c., will be desirable. Thus, injection of ammonia into the veins has been found useful by Halford and others in cases of snake bites. We must also endeavor to promote the elimination of the poison from the body by exciting the secreting functions.

DETECTION OF POISONS.

Notice the smell, color, and general appearance of the matter submitted for examination. The odor may show the presence of prussic acid, alcohol, opium, or phosphorus. The color may indicate salts of copper, cantharides, &c. Seeds of plants may be found.

This examination having been made, the contents of the alimentary canal, and any other substances to be ex-

amined, must be submitted to chemical processes. They are generally mixed, though the pure substance may sometimes be submitted to an analyst.

Simple filtration will sometimes suffice to separate the required substance; in other cases dialysis will be necessary, in order that crystalloid substances may be separated from colloid bodies. In the case of volatile substances distillation will be required.

For the separation of an alkaloid the following is the process of Stas:—1. Treat the organic matter with twice its weight of absolute alcohol, to which from ten to thirty grains of tartaric or oxalic acid has been added, and subject to a gentle heat. 2. The residue, after filtration and drying, is dissolved in a small quantity of distilled water, treated with bicarbonate of soda, and the alkaloid set free. 3. The resulting liquid, holding the alkaloid in solution or suspension, is mixed with four or five times its bulk of ether, chloroform, or benzole, briskly shaken, and left to rest. The ether floats on the surface, holding the alkaloid in solution. 4. A part of this ethereal solution is poured into a watch-glass and allowed to evaporate. If the alkoloid be volatile, oily streaks will appear on the glass; if not volatile, some crystalline traces will be visible. If a volatile alkaloid, add 20 or 30 grains of strong solution of caustic potash or soda; draw off the ethereal solution with a pipette, and shake with water acidulated with sulphuric acid. The ether being again drawn off, the alkaloid is left as a sulphate. This liquid is again treated with potash or soda and ether, and the ether being again evaporated the alkaloid is left sufficiently pure.

If a fixed alkaloid, treat similarly with soda, or potash and ether, as above, and evaporate, when the solid alkaloid will be left in an impure state. To purify it add a small quantity of dilute sulphuric acid, and after evaporating to three fourths of its bulk add a saturated solution of carbonate of potash or soda. Absolute alcohol will then dissolve out the alkaloid and leave it on evaporation in a crystalline form.

In order to isolate an inorganic substance from organic matter Fresenius' method is adopted. Boil the finely divided substance with about one-eighth its bulk of pure hydrochloric acid; add from time to time potassic chlorate, until the solids are reduced to straw-yellow fluid. Treat this with excess of bisulphite of soda, then saturate with sulphuretted hydrogen until metals are thrown down as sulphides. These may be collected and tested.

For the detection of minute quantities the microscope must be used, and Guy's and Helwig's method of sublimation will be found very advantageous. Crystalline poisons may be recognised by their characteristic forms.

LIST OF ANTIDOTES.

Acids, Mineral or Vegetable,	Give freely of chalk, or magnesia, in mucilaginous drinks; to quiet pain, small doses of morphia; in case of collapse, stimulants hypodermically, and food per rectum.
Aconite, ...	Emetics at once; stomach-pump, if at hand; strychnia (gr. 1-40th), tr. digitalis (mm. x), whiskey (ozs. i-ii), hypodermically.

Alcohol, . . .	Emetics; ammonia, digitalis and caffein hypodermically; cold douche to the head.
Alkalies, . . .	Use the stomach-pump, washing out the stomach gently with warm water; give demulcent drinks; same after treatment as in case of poisoning by acids.
Antimony, .	Stomach-pump, promptly but gently; give tannic or gallic acid in demulcent drinks; in prostration, hypodermics of whiskey, strychnia and digitalis, as above.
Argent. Nit.,	Saturated solution of common salt; afterwards, the stomach-pump; also the white of egg.
Arsenic, . . .	Emetics and stomach-pump at once; give Hydrated Peroxide Ferri in 1-2 to 1 oz. doses every fifteen minutes, until somewhat relieved; if not at hand, the dialyzed iron, and demulcent drinks; whiskey, etc., hypodermically, and food per rectum.
Belladonna, (*Atropine*,)	Emetics or stomach-pump; tannic acid in mucilaginous drinks; morphia subcutaneously in 1-2 gr. doses every hour until delirium abates; whiskey by the stomach; also ammonia.
Cannabis Indica,	Evacuate the stomach; afterwards, stimulants; acetic acid along the spine; electricity.
Cantharides,	Stomach-pump or emetics; mucil. acaciæ; morphia by the stomach; sweet-oil, 4 dr., every hour for six hours.
Carbolic Acid,	Stomach-pump or emetics; aq. calcis; sweet-oil as above; stimulants.

Chloral Hydrat,	Stomach-pump; strychnia hypodermically, in combination with whiskey, caffein and ammonia; artificial respiration; electricity.
Chloroform, .	Whiskey, atropine, strychnia and digitalis, hypodermically; raise feet and legs, lower head, pull tongue well forward, perform artificial respiration, use electricity, and resort to inhalation of oxygen.
Colchicum, .	Emetics or stomach-pump; stimulants; caffein, strychnia, digitalis and whiskey hypodermically; mucil. acaciæ.
Conium, . .	Digitalis, strychnia and whiskey hypodermically; electricity.
Copper Salts,	Stomach-pump; whites of four eggs every hour; demulcent drinks; morphia; food by the rectum.
Hydrarg. Chlor. Corrosivum, . .	Stomach-pump or emetics; whites of eggs and flour in demulcent drinks; sweet oil; morphia hypodermically; whiskey same way.
Creosote, . . .	Stomach-pump or emetics; demulcent drinks; morphia hypodermically.
Croton Oil, .	Emetics; mucilaginous drinks; opium by the stomach.
Digitalis, . .	Emetics or stomach-pump; stimulants; tannic acid in solution.
Elaterium, .	Demulcent drinks; opium by the mouth; astringents.
Hydrocyanic Acid, . . .	Whiskey and strychnia hypodermically; cold douche; artificial respiration; inhalation of oxygen; electricity; precipitated oxide of iron, freshly prepared, followed by a solution of potass. carbonat.

Iodine, . . .	Starch in water.
Lead Salts, .	Epsom salts; sulphate of zinc; emetics hypodermically; stomach-pump; demulcent and opiated drinks.
Mushroom, .	Emetics: daturia (gr. 1-16) hypodermically; morphia hypodermically; stimulants, and stimulating applications to surface.
Nux Vomica, (*Strychnia*,)	Emetics or stomach-pump; rectal injections of tobacco; chloral hydrate and bromide of potassium in large doses; chloroform to relieve spasm of glottis; physostigma hypodermically; stimulants, if needed; morphia in 1 gr. doses, repeated if necessary.
Opium, . . .	Stomach-pump at once; caffein, strychnia, and atropia sulph. hypodermically (1-20th gr. atropia antagonizes 1 gr. morphia); flagellation; rectal injections; fluid ext. coffee; walking; cold douche; electricity; inhalation of oxygen; bottles of hot water to epigastrium.
Phosphorus, .	Emetics or stomach-pump; spts. turpentine; whites of eggs; demulcent drinks; stimulants hypodermically; magnesia in mucil. acaciæ. ☞ *Give no oils or fats of any kind.*
Stramonium,	Same treatment as in Belladonna poisoning; be careful in using opium with children.
Zinc Salts, .	Stomach-pump; whites of eggs; demulcent drinks, followed by opium.
Veratrum, .	Emetics; stimulants, and strychnia hypodermically; also morphia hypodermically.

CHEMICAL

AND

MICROSCOPICAL TESTS.

THE URINE.

For urinary examination, the following apparatus and chemicals are needed, viz:—three or four watch glasses, red and blue litmus paper, a urinometer, test tubes, a spirit lamp, drop tubes and stirring rods, a graduated burette, a fluid graduated measure, and a small flask; also prepared copper solution, nitric acid, acetic acid, liquor potassæ, liquor ammoniæ fort.; also, a good microscope, provided with a first-class one-fourth inch objective, having a power of 450 diameters.

The following table exhibits, in convenient form, the normal and abnormal qualities of urine, together with their signification and tests.

I. *Quantity.* Normal, 30 to 45 ozs. in 24 h'rs.	Increased	Diabetes, (high sp. gr.)	
		Hysteria, (low sp. gr.)	
	Diminished	Beginning of febrile attacks.	
		Acute nephritis.	
	Passed oftener	Cystitis, caruncle of the urethra, gonorrhœa, vesical calculus, and foreign bodies in the bladder.	

II. *Color.* Normal, pale straw or amber.

- High
  - Increase of urea, uric acid, etc., (high sp. gr.)
  - Certain forms of Bright's disease, (low sp. gr.)
  - Febrile conditions, presence of blood, etc.
  - Brownish or greenish yellow: bile.
  - Pink: acute rheumatism, acute disease of liver.
- Pale
  - Diabetes, (high sp. gr.)
  - Excess of water, (low sp. gr.)
  - Hysteria and similar nervous affections, [low, sp. gr.]

III. *Reaction.* Normal, reddens blue litmus paper.

- Highly acid
  - Deficiency of the gastric juice.
  - Effect of administration of mineral or organic acids.
- Alkaline
  - From fixed alkali, [physiological], heat does not restore color of red litmus paper.
  - From volatile alkali, [pathological], heat restores color of red litmus paper.

IV. *Specific Gravity.* Normal, ab't 1020.

- High
  - Urine high-colored indicates increase of urea.
  - Urine pale indicates diabetes.
- Low
  - Urine high-colored indicates certain forms of Bright's disease.
  - Urine pale indicates excess of water.

V. TESTS FOR NORMAL INGREDIENTS:

1. *Urea.*
Normal, estimated from 286 to 542 grs.

Abnormally large	Result of bodily or mental excitement.
Strong odor, a deep yellow color, high sp. gr.	Acute febrile condition, with emaciation.
	Certain forms of indigestion.
Abnormally small	Long continued organic disease.
	Want of secreting power of kidneys; symptoms of uræmic poisoning.

TEST: Evaporate 2 drs. of urine to 1 dr.; add equal parts of nitric acid; if there be any excess of urea there will be crystallization in abundance. See microscopical test, *supra*.

2. *Uric Acid.*

Abnormally large	Acute inflammation.
	Fevers.
	Acute rheumatism.
Abnormally small	Adv'ced Bright's disease and other affections in which the eliminating powers of the kidneys are obstructed.

TEST: Add equal bulk of nitric acid to 2 drs. of urine; let stand for some hours; the crystals of uric acid formed will be dissolved by heat; or add nitric acid, a few drops, and evaporate to dryness over a lamp: a drop of ammonia added will produce a rich purple.

3. *Urates.*

TEST: The deposits found by their precipitation are pink, or brown or even white. Heat dissolves and acids decompose them.

- Abnormally increased
  - Acute inflammation.
  - Fevers.
  - Acute rheumatism.
- Abnormally diminished
  - In affections in which action of the kidneys is impeded.

4. *Phosphates*

TEST: *For earthy phosphates.* A few drops of ammonia cause whitish precipitate, which is not dispersed by heat.

For alkaline phosphates. Take fluid from which earthy phosphates have been removed by filtration, and add saturated solution of sulphate magnesia. Examine with microscope.

- Apparent increase, due to their precipitation by want of acidity of urine.
  - Great general debility, phthisis and wasting diseases. Termed the phosphatic diathesis.
- Real increase
  - Acute inflammatory diseases of nervous structure.
  - Fractures of skull, causing inflammation of the brain.
  - Acute rheumatism.
  - Ab'nd't animal food.
  - Very active exercise.

5. *Chlorides.*

TEST: Acidulate with nitric acid and add argent. nit.; a dense white precipitate will occur.

- Increased, after diminution, favorable sign.
- Abnormally diminished
  - Acute inflammation.
  - Absent in pneumonia.

6. *Sulphates*:—Increased { By exclusive animal diet; violent exercise; administration of potassa. Also increase with the urea, except in rheumatic fever.

TEST: Add a few drops of nitric acid, and subsequently 15 to 20 gtts. sat. sol. of chloride of barium; examine with microscope.

7. *Creatin* and *Creatinin*.—Increased by active muscular exertion, and spasmodic affections.

VI. TESTS FOR ABNORMAL INGREDIENTS.

1. BILE. (Urine dark-colored.) *Test for Coloring Matter*. Pour small quantities of urine on a white plate; a drop of nitric acid added will produce a play of color —violet, green and red. *Tests for Biliary Acids*. Put 2 drs. of urine in a test-tube, drop in a small piece of lump sugar; allow a half teaspoonful of strong sulphuric acid to trickle down the tube. If biliary acids be present a deep purple hue will show itself at junction of acid and urine.

2. SUGAR. [Urine light colored, high sp. gr., sweetish smell, excessive in quantity.] *Test*. Add a drop or two of a solution of sulphate of copper, and heat in a test-tube; then add liquor potassæ in excess and boil. If the urine contains sugar, there will be a precipitate of reddish-brown suboxide of copper. ☞Fehlings' test is alone perfectly reliable.

3. ALBUMEN. *Test*. Boil the suspected urine, and add a few drops of nitric acid; the albumen, if there be any, will coagulate.

4. BLOOD. [Urine red, or of dingy or smoky hue.] The diagnosis can be made with certainty only by the microscope.

5. OXALATE OF LIME. [Urine high sp. gr., increase of urea, and usually a cloudy deposit.] Microscope the best and readiest means of detection.

6. FAT. Tests for fat are, its solubility in ether, and microscopic characters.

7. SEDIMENTS
- 1. Light and floccu-lent cloudy deposits. — Mucus entangling epithelial cells or spermatozoids.
- 2. Dense, abundant, white deposits. — Urates or phosphates.
- 2. Dense, abundant, white deposits. — Perhaps pus or extraneous matter.
- 3. Yellow or pink deposits: always due to urates.
- 4. Granular or crystalline, reddish color, and small in quantity: uric acid.
- 5. Dark, sooty or dingy red deposits: blood.

MICROSCOPICAL EXAMINATION OF URINARY DEPOSITS.

Pus appears as round, granular bodies from 1-2000 to 1-3000 inch in diameter; on the addition of a drop of dilute acetic acid to the edge of glass cover, the corpuscles lose their granular appearance and show from two to four nuclei each.

Blood Globules appear as bi-concave disks of a pale yellow color, and vary in size from the 1-3000 to the 1-3500 of an inch in diameter· they are often found in *rouleaux*.

Renal Casts, epithelial, granular, oily, waxy, or bloody in their contents, vary from 1-300 to 1-1000 of an inch in diameter.

Mucus appears as thin, filmy lines.

Renal Epithelium has a distinct nucleus, and is a trifle larger than a pus corpuscle; in acute nephritis, it is swelled and has a cloudy look; in chronic renal disease, it is granular, fatty, and atrophied.

Triple phosphates appear as large, prismatic crystals.

Oxalate of lime as octagonal and dumb-bell crystals.

Uric Acid as rosettes of a yellow or reddish brown color.

Urate of Ammonia as spheres of a blueish or brownish color.

Phosphate of Lime as an aggregation of short rods.

Spermatozoa as very small oval bodies having a long cilia or tail attached.

Fungi.—*Bacteria:* trembling points (monads); vibrating lines, of length of blood corpuscle (staff-shaped); two or more of the staff-shaped joined together (vibrios); punctiform masses held together by some gelatinous substance (zoöglea-form). *Yeast* [*torulæ*]: granular spores, or chain-like aggregations of cells. *Sarcinæ:* cuboids, or chains of cuboid cells, showing segmentation into cubes

TESTS FOR POISONS.

Sulphuric Acid.—*Tests.* Concentrated acid chars organic matter; heat evolved on boiling with water, and sulphurous fumes when boiled with chips, or mercury.

Fatal dose, one drachm.

Fatal period, one hour.

Nitric Acid.—*Tests.* Irritating orange fumes are given off by boiling over copper filings; stains the skin bright yellow; reddens morphia and its salts.

Fatal dose, two drachms.

Fatal period, one hour and three-quarters.

Hydrochloric Acid.—Fumes in moist air, and yields dense white vapors with ammonia; gives off chlorine when boiled with black oxide of manganese; diluted, it yields a white precipitate with nitrate of silver, which is soluble in ammonia.

Fatal dose, half an ounce.

Fatal period, five and a half hours.

Hydrocyanic Acid.—*Tests.* With nitrate of silver a white precipitate evolving cyanogen with heat. Liquor potassæ and sulphate of iron give a brownish-green precipitate, which turns to Prussian-blue with hydrochloric acid. Liquor potassæ and sulphate of copper give a greenish-white precipitate, becoming white with hydrochloric acid. Bisulphide of ammonia gives sulphocyanide of ammonium; this develops a blood-red color with perchloride of iron, unchanged by corrosive sublimate.

Fatal dose, about forty minims.

Fatal period, from two to five minutes.

Oxalic Acid.—*Tests.* White precipitate with argent. nitrat, soluble in ammonia; when dried and heated on platinum foil, disperses as white vapor; salts of lime in excess give white precipitate, insoluble in ammonia but soluble in nitric acid.

Fatal dose, three drachms.

Fatal period, instantaneous.

Alkalies.—(Liq. potass., liq. ammon., sodæ.)—*Tests.* Soapy between the fingers; they *blue* reddened litmus paper; are *not* precipitated on the addition of solution of potassic carbonate.

Antimonium.—*Tests.* Soluble in water, but not in alcohol; a drop of solution evaporated leaves crystals, either tetrahedric or cubes with edges bevelled off; sulphuretted hydrogen passed through a solution gives an orange-red precipitate,—the mineral acids yield a white; from organic substances antimony may be removed by Marsh's "arsenic test."

Fatal dose, two grains, in an adult.

Fatal period, from a few hours to some weeks.

Nitrate of Silver.—*Tests.* Black precipitate with sulphuretted hydrogen, white with hydrochloric acid.

Arsenic.—*Tests.* Arsenious acid heated on platinum foil sublimes unchanged as a white smoke; heated in a test-tube, small crystals form; mixed with charcoal and heated in a test-tube, a metallic coating forms on the tube. *In solution*, arsenic, on the addition of ammonio-nitrate of silver, gives a yellow precipitate (arsenite of silver); ammonio-sulphate of copper gives a green precipitate

(Scheele's green); sulphuretted hydrogen water yields a yellow precipitate.

Marsh's Test.—Put the suspected liquid into a bottle with metallic zinc and sulphuric acid. Hydrogen is thus set free, which decomposes arsenious acid and forms arseniuretted hydrogen. The gas is carried off by a fine tube and ignited. A piece of glass or porcelain held to the flame has a metallic ring deposited on it.

Reinsch's Test.—Boil the suspected liquid with one-sixth or one-eighth of hydrochloric acid, and introduce a slip of bright copper. If arsenic be present it will form an iron-grey deposit. This can be obtained pure by reduction.

Barium Chloridum.—*Tests.* The addition of a few drops of sulphuric acid yields a *white* precipitate, insoluble in nitric acid; mixed with solution of argent. nit., a *curdy-white* precipitate forms, insoluble in nitric acid, but soluble in liq. ammoniæ.

Cantharides.—*Tests.* Sulphuric or nitric acids produce no change of color; water added to an alcoholic solution gives a white precipitate.

Fatal dose, one ounce of tincture.

Fatal period, 24 to 36 hours.

Copper.—*Tests.* All cupric salts, in solution or otherwise, are *blue* and *green*. Polished steel put into a solution receives a coating of metallic copper; ammonia gives a blue precipitate, soluble in excess; ferro-cyanide of potassium gives a rich red-brown precipitate.

Iron. (Sulphate and Perchloride.)—*Tests.* Black

precipitate with sulphide of ammonium; greenish-blue precipitate with ferro-cyanide of potassium.

Corrosive Sublimate.— *Tests.* The following table, from Dr. Husband's handbook, shows the reaction of corrosive sublimate with reagents:

1. With Iodide of Potassium: Bright scarlet color.
2. With Potash Solution: Bright yellow color.
3. With Hydrosulphuret of Ammonia: First a yellowish, then a black color.
4. Heated in Reduction Tube: Melts, boils, is volatilised and forms a white crystalline sublimate.
5. With Ether: Freely soluble; the etherial solution, if allowed to evaporate spontaneously, deposits the salt in white prismatic crystals.
6. Heated with Carbonate of Soda in a Reduction Tube: Globules of metallic mercury are produced.

Fatal dose, three grains to a child.

Fatal period, half an hour.

Iodine.—*Tests.* To an organic mixture containing iodine add bisulphide of carbon, and shake; the iodine may be obtained on evaporation as a sublimate; gives a blue color with starch.

Iodide of Potassium.—*Tests.* Iodide of potassium in solution gives a bright yellow precipitate with lead salt; a bright scarlet one with corrosive sublimate; and a blue color with sulphuric or nitric acid and starch. In organic mixtures a current of hydrosulphuric acid gas should be passed through: this changes the free iodine into hydriodic acid. Drive of excess of gas, add potash in excess, filter and evaporate; char the residue at low

red heat, powder the charred mass, treat with distilled water, and filter; evaporate and apply acid and starch.

Nux Vomica. (Strychnia.)—*Tests.* The alkaloid may be separated by Stas' process, and will then be found to be unaffected by sulphuric acid, but to give a purple-blue color, changing to crimson and light red, with peroxide of lead or of manganese, bichromate, ferridcyanide or permanganate of potash. A very minute quantity (1-5000th gr.) placed on the skin of a frog, after drying, causes tetanic convulsions.

Fatal dose, 1-4th grain.

Fatal period, ten minutes.

Opium.—*Tests.* Opium itself cannot be directly detected, but we must test for morphia and meconic acid. These may be separated from organic mixtures thus: Boil the organic mixture with distilled water, spirit, and acetic acid; strain, and to the fluid passed through add acetate of lead till precipitate ceases. Filter. Acetate of morphia passes through and meconate of lead remains. Sulphuretted hydrogen sets free the meconic acid from the latter, throwing down sulphide of lead.

Morphia, or its acetate, gives an orange-red with nitric acid; decomposes iodic acid, setting free iodine; with perchloride of iron, gives a rich indigo-blue; with bichromate of potash, a green turning to brown.

Meconic Acid gives a blood-red color with perchloride of iron, not discharged by corrosive sublimate or chloride of gold. The similar color produced by sulpho-cyanide of potassium and perchloride of iron is discharged by chloride of gold.

Phosphorus.—*Tests in Organic Mixtures.* Mitscherlich's method is the best. Introduce the suspected material into a retort; acidulate with sulphuric acid; distil in the dark, through a tube kept cool by a stream of water. As the vapor passes over and condenses, a flash of light is perceived, which is the test.

Fatal dose, one grain.

Fatal period, four hours.

Alcohol.—*Tests.* Smell; dissolves camphor; with dilute sulphuric acid and bichromate of potash, turns green and evolves aldehyde. The following table, from Dr. Husband, gives the points of distinction between concussion of the brain, alcoholic poisoning and opium poisoning:

CONCUSSION OF BRAIN.	ALCOHOL.	OPIUM.
Marks of violence on head.	No marks of violence unless person has fallen. History will be of use.	As alcohol.
Stupor sudden.	Excitement precedes sudden stupor.	Symptoms slow. Drowsiness, stupor, lethargy.
Face pale, cold; pupils sluggish, sometimes dilated.	Face flushed; pupils generally dilated.	Face pale; pupils contracted.
Remission rare. Patient recovers slowly.	A partial recovery may occur, followed by death.	Remission rare.
No odor of alcohol in breath.	Odor of alcohol in breath.	Odor of opium in breath.

Lead.—*Tests.* Sulphuretted hydrogen gives a black precipitate; liq. potassa, white precipitate; iodide of potassium a bright yellow precipitate.

Fatal dose and period, uncertain.

Ether.—*Tests.* Vapor burns with smoky flame, depositing carbon. Sparingly soluble in water; with bichromate of potash and sulphuric acid, same as alcohol.

Chloroform.—*Tests.* Taste and color; high specific gravity; burns with green flame; dissolves camphor, gutta percha and caoutchouc.

Conium.—*Tests.* With nitric acid gives deepened color and dense white fumes; pale red, deepening, with hydrochloric acid.

Digitalis.—*Tests.* [For Digitalin.] A white substance, sparingly soluble in water, not changed by nitric acid; turns yellow, changing to green, with hydrochloric acid; evaporated to dryness and treated with sulphuric acid, yields a rose color, turning mauve with vapor of bromine.

Detection of Blood-Stains.—Stains may require detection on clothing or cutting instruments, floors, furniture, etc. The following, from Dr. Husband's handbook, gives the various distinctive characters of blood-stains.

Ocular Inspection. Blood-stains on dark-colored materials, which, in daylight, might be easily overlooked, may be readily detected by the use of artificial light, as that of a candle, brought near the cloth. Blood-spots, when recent, are of a bright red color, if arterial; of a

purple hue if venous; the latter becoming brighter on exposure to the air. After a few hours, blood-stains assume a reddish-brown tint, which they maintain for years.

Microscopic Demonstration. With the aid of the microscope blood may be detected by the presence of the characteristic blood-corpuscles.

Action of Water. Water has a wonderfully solvent action on blood, the stains rapidly dissolving when the material on which they occur is placed in cold water, a bright red solution being formed. Rust is not soluble in water.

Action of Heat. Blood-stains on knives, etc., may be removed by heating the metal, when the blood will peel off, at once distinguishing it from rust. Should the blood-stain on the metal be long exposed to the air, rust may be mixed with the blood, when the test will fail. The solution obtained in water is coagulated by heat, the color entirely destroyed, and a flocculent, muddy-brown precipitate formed.

Action of Caustic Potash. The solution of blood obtained in water is boiled, when a coagulum is formed soluble in hot caustic potash, the solution formed being greenish by transmitted and red by reflected light.

Action of Nitric Acid. Nitric acid added to a watery solution produces a whitish-gray precipitate.

Action of Guaiacum. Tincture of guaiacum produces in the watery solution a reddish-white precipitate of the resin; but on addition of an etherial solution of peroxide of hydrogen, a blue color is developed.

Hæmin Crystals. These are produced by heating a drop of blood, or a watery solution of it, with glacial acetic acid in a watch-glass, and evaporating the mixture. Crystals of hæmin may be detected by the microscope in the residue. They are rhomboidal, tubular or otherwise, of yellowish-red or dirty blood-red color. If the stain is old, salt should be added to the acetic acid solution.

Spectroscopic Appearances. Two dark absorption bands appear, situated at the junction of the yellow with the green rays, and in the middle of the green rays of the spectrum. The spectrum of alkanet root in solution of alum differs only from that of recent blood in having a third absorption band between the green and blue.

There is no means of distinguishing menstrual blood from human blood the result of a wound.

It was formerly hoped that the microscopist might discover changes in the form of the blood-cells in disease, and in this way be able to promote, pathological physiology as well as diagnosis. These beautiful dreams have not, in general, been fulfilled. However various its composition may be, the blood presents the same microscopic appearance. It is also to a certain degree the case, that even with regard to the normal life of the blood a considerable obscurity still prevails: that we have but an extremely incomplete conception of the new formation and disappearance of the cells. [Frey, on "*The Microscope and Microscopical Technology*," p. 236. The author's chapter on the blood deserves to be read by every practitioner.]

MEDICAL AND SURGICAL MEMORANDA.

Adhesive Plaster, To Remove.—First wet the plaster with a mixture of equal parts of *Ol. Terebinth* and *Ol. Olivæ;* afterwards wash off with warm soap-suds.

Anæsthetics, General.—The patient ought not to have eaten solid food for three or four hours prior to an operation; on the other hand, he should not be faint from the want of proper nourishment. Be cautious in administering chloroform to a person known to be affected with disease of the heart, with a constant tendency to syncope, or with a weakened state of the brain. It is a good plan to give a patient a glass of light wine prior to the anæsthesia. Have him placed in the recumbent position, with his clothes *all* unfastened and the room perfectly *quiet*. The following is highly recommended by the London Committee, and others: R—*Alcoholici*, portio I; *Chloroformi*, portio II; *Ætheris*, portio III. Administer on flannel stretched over a wire frame. Do not allow the inhalation to occupy more than *four* minutes. *Remember* that the first symptoms produced are those of confusion of the intellect and thickness of speech; next,

the muscular system becomes affected, and, lastly, there is complete unconsciousness and muscular flaccidity. with calm and equable respirations, and an abolition of the sensibility of the surface, which may be conveniently ascertained by touching the conjunctiva without producing any closure of the lids. *Signs of danger:* Fluttering or intermittent pulse, sudden blanching of the face, difficult breathing, and spasms. After the administration, the patient should be kept upon a cold diet for 24 hours.

Anæsthetics, Local.—Paint the part to be incised with *Acidi Carbolici*, 1 part to 20 of water, for a quarter of an hour; then apply the pure acid. Incise immediately. If preferred, a spray of highly rectified ether may be employed; or, what is better, *Rhigolene* in the form of a spray.

Antiseptics for Wounds.—*Boracic Acid, Salicylic Acid* or *Carbolic Acid;* also, *Comp. Tr. Benzoini; Bals. Peruv.* acts as an excellent stimulant.

Antiseptic Solutions, Lister's.—To 30 ozs. of water add 1 1-2 oz. of crystallized carbolic acid; this gives a solution (1 to 20) useful for washing out a wound, washing the surgeon's hands, for dressing the wound, and spraying the wound during an operation.

Dilute the above solution with equal parts of water and the result will be another solution (1 to 40) suitable for the sponges, instruments, etc.

The articles necessary for operations or dressings are: A steam spray-producer; a solution of acid, 1 to 20; another, 1 to 40; antiseptic gauze; a piece of Mackintosh cloth; drainage tubes; carbolized oil silk; bandages of

antiseptic gauze; catgut ligatures; carbolized wax ligatures.

All arteries should be tied with carbolized catgut ligatures, and cut off short in the wound. The wound being thoroughly cleansed, a drainage tube with holes cut in the sides is passed through the wound, the parts brought together and secured by carbolized catgut or silk suture. Over the wound place a piece of carbolized oil silk dipped freshly in the 1 to 40 solution; over this place two layers of prepared gauze, dipped in the 1 to 40 solution. On this place six or eight layers of the gauze, a piece of Mackintosh cloth being placed, with the smooth surface down, between the superficial and the next layer of gauze. The parts for a distance above and below the wound are to be bandaged with rollers of antiseptic gauze. This dressing is not to be changed *unless the patient has high fever* coming on after the operation, or the discharge from the wound soaks through the dressing. As often as the discharge wets through the dressing so often should the dressing be removed. ALL DRESSINGS SHOULD BE MADE UNDER THE CARBOLIC SPRAY. Care must be taken during an operation that the ether does not take fire from the flame of the atomizer spirit-lamp. The flame should be invariably protected by gauze.

Asphyxia.—*From Carbonic Acid Gas.* Remove the person *at once* into the fresh air; give a hypodermic injection of atropine and strychnia, with some alcoholic stimulant. Apply electricity at once and continue its use; put bottles of hot water to feet and epigastrium; slap the body vigorously; use the cold douche; perform artificial

respiration in the manner directed below; remove collar or other constricting articles about the neck.

From Hanging. Cut the patient down: use cold affusion; electricity, ammonia by inhalation and hypodermic injection; atropine and strychnia, in the same manner; tickle fauces with feather; slap body; loosen clothing at neck; perform artificial respiration in manner described below; inhalation of oxygen.

From Drowning. Raise patient, holding head downward for a moment, to allow any water to run from the lungs, imitating the inspiratory and expiratory movements at the same time; apply electricity, if at hand; lose no time; strip off wet clothes and wrap in blankets, robes, or anything warm that is at hand; give hypodermics of whiskey, atropine, strychnia, and coffee (or caffein), one or all. Hot bottles to feet and epigastrium; artificial respiration to be commenced at once, and continued till patient is able to breath freely. Do not cease efforts for at least an hour. Ammonia to nostrils, feather to fauces, cold douche to face and slapping the surface are all useful.

To Perform Artificial Respiration. (Sylvester's method.) First remove all foreign bodies or mucus clogging the mouth, throat or nose, and be sure that all clothing is loosened about the neck. Then slowly raise and extend the arms upwards by the sides of the head, until the elbows nearly touch each other; next, as slowly, restore the arms to the sides of the chest, and slightly press them against it; pressure may be made upon the lower part of the chest and abdomen each time the arms are drawn up.

Apoplexy.—Local bleeding in active congestion, or ice or cold water to the cranium and nape of the neck; loosen clothing about the neck and slightly raise the head; mustard to the feet and epigastrium; two drops of *Croton Oil* on the tongue frequently proves servicable. Subsequently the bromides may be indicated.

Burns and Scalds.—Dust the parts with bicarb. sodæ, or moisten with saturated solution of the same; where the cuticle is broken, swathe with folds of soft lint anointed with simple cerate. Later, dress the wound with the following:—*Acidi Carbolici*, 1 dr.; *Ol. Olivæ*, 3 drs. The best stimulant for the shock is hot, strong coffee, to which a little brandy may be added if absolutely necessary.

Catheter, To Pass a.—Select the proper size, beginning with at least Nos. 4 or 5, warm it, by friction or otherwise, and then well oil for two-thirds its length. Standing at the left hand of the recumbent patient, the surgeon should gently stretch she penis with the left hand, while with the right the catheter is inserted; almost by its own weight, it should pass along the canal, the handle being directed along the left groin, but gradually getting into the median line, until an obstruction is met with. Against this gentle pressure with the end of the catheter should be made for some minutes, when a gradual yielding will be distinctly felt, and, in a few moments more, the instrument will probably enter the bladder.

Epistaxis.—Treat by the application of cold to the head and face, or by the inhalation of turpentine vapor, or by the use of powdered alum as snuff. If alarming, resort to the tampon.

Fractures.—*Simple fractures* should be put up at once, in order to forestall anchylosis; if swelling has already taken place, resort to the sling and cold lotions. *Dislocations accompanying fractures of the shafts of bones* should be reduced as soon as the limb has been firmly put up in splints. *Compound fractures* should be speedily converted into simple cases by healing the rent in the skin; a piece of lint covered with blood or collodion is desirable, but if the skin is very badly damaged, convert the sore into an abscess by sealing it up, and then have recourse to the water dressing. Compound fractures into joints require exsection, if in the upper extremities; amputation if in the lower. *In making comparative measurements of limbs* in the upper extremity, make use of the following points: (1) from the extremity of the acromion process to the external condyle of the humerus; (2) from the tip of the coracoid process to the inner condyle; (3) from the condyles to the styloid processes of the radius and ulna. *In the lower extremity:* (4) from the anterior superior spinous process of the ilium to the *lower* border of the patella; (5) from the crest of the ilium to the top of the trochanter; (6) from the patella to the inner or outer malleolus; (7) from the anterior superior iliac spine to the malleoli. A line drawn from the anterior superior iliac spine to the tuberosity of the ischium will, in the healthy subject, just touch the top of the great trochanter. This is Nelaton's test line for dislocation of the femur upwards or backwards, in either of which accidents the trochanter will reach above the line.

Hæmoptysis.—Salt; gallic acid; inhalation of astringents from the atomizer; cold compresses to the chest; ergot, small doses, frequently repeated.

Hæmorrhage.—*After extraction of teeth.* Forcibly plug the cavity with lint soaked in solu. subsulph. ferri., and keep in place by pressure of the jaw. *Arterial.* Torsion; ligature; actual cautery; compression; hot water.

Insolation [Sunstroke].—The cold douche; exclusion of light; the immediate use of stimulants, external and internal, by the rectum and mouth.

Lightning Stroke.—Recumbent position; loosen clothing; stimulants; and, *without fail*, venesection. Tonics and galvanism should be comprised in the after-treatment.

Sea-Sickness.—Amyl nitrite, 3 drops, inhaled from a handkerchief. Bromid. potass. internally.

Syncope.—Loosen clothes; abundance of fresh air; patient lying down, with head *low*; cold water over the face; inhalation of ammonia; galvanism; and stimulants internally.

Temperature.—Average normal [of adults] 98.5° F.; daily variation, 1.5°, highest in the evening; a rapid rise or fall indicates danger; a gradual decline convalesence; 106° is the average limit at which recovery may take place; 110° especially in puerperal mania and pneumonia, signifies collapse. A rise of 1°, when already above 100°, is equivalent to an increase of 10 beats of the heart.

VISCERAL MEASUREMENTS, ETC.

The Heart.—REGIONAL ANATOMY. Extends transversly from 1-2 inch to right of sternum to within 1-2 inch of left nipple; vertically from, and including, the second to the fifth intercostal space, the auricles being on a line with the third costal cartilages, and extending a little above and below them.

MEASUREMENTS. Longitudinally, 5 inches; transversely, from median line to the left, on third rib, 2 1-2 to 3 inches; on fourth rib, 3 1-2 to 4 inches; on fifth rib, 3 to 3 1-2 inches. Extends 1-2 inch to right of dextral border of sternum.

VALVES. *Aortic*, behind sternum, near left edge, and in line of third intercostal space; *mitral*, behind left fourth costal cartilage, near sternum; *pulmonary*, behind left third costo-sternal articulation; *tricuspid*, behind center of sternum on line of fourth costo-sternal articulation.

AREA OF PERCUSSIONAL DULNESS. *Superficial*, triangular, apex below left third costo-sternal articulation, the base on line with sixth costal cartilage; does not exceed 2 inches in any direction. *Deep*, (brought out by strong percussion,) corresponds to cardial measurements, the central portion being the area of "superficial dulness."

MURMURS. *Aortic*, whole length and (upper part) width sternum. Only murmur that is propagated into the carotids. If "obstructive," is heard with first sound of heart, maximum intensity being heard at second dextral sterno-costal articulation. If "regurgitant," is diastolic maximum intensity at the same place as the "obstruc-

tive." *Mitral*, "obstructive" blubbering murmur just before the first heart-sound, maximum intensity being near apex beat; is larger than any other murmur; never heard at the back. "Regurgitant" takes the place of, or follows, first heart-sound, greatest intensity being at apex beat; nearly as intense between fifth and eighth vertebræ at the back. *Pulmonic*, are rare and are limited to a small circular area about the region of the valves. *Tricuspid*, "regurgitant" heard in a triangular area extending (and partially including) from the second to the fifth intercostal space, left side, though rarely heard above third rib; the base corresponds to line drawn from fifth left to fourth right intercostal space. Point of greatest intensity, near xiphoid cartilage, left side. Is a blowing murmur heard with, or taking the place of the first heart-sound. Jugular pulsation pathognomonic when it can be detected.

The Kidney.—AREA OF PERCUSSIONAL DULNESS. Patient should lie on the face; the long diameter extends from the eleventh rib to the crest of the ilium, and measures 4 inches; the transverse diameter measures 2 inches.

The Liver.—AREA OF PERCUSSIONAL DULNESS. Extends from lateral surface of eighth right rib obliquely upwards across the chest to 2 inches beyond median line on level with the fifth intercostal space, measuring some 12 inches; superiorly it is limited by the fifth rib, inferiorly by the free borders of the lower ribs. At the right of the median line, in front, the transverse diameter of this area measures 3 inches; on a line with the right nipple, 4; on the side, 4 1-2; on the back, 4.

The Spleen.—Have patient lie on right side, when the superior border will be found to be limited by the ninth rib; the inferior, by free borders of the "floating" ribs; this gives long diameter, measuring from 4 to 5 inches. The short diameter varies from 3 to 4 inches.

ERUPTION OF THE TEETH.

Deciduous.—(20 in number). Central Incisors, 7th month; Lateral Incisors, 7th to 10th month; Ant. Molars, 13th to 14th month; Canine, 14th to 20th month; Post. Molars, 18th to 36th month.

Permanent.—(32 in number). First Molars at 6 1-2 years; Two Middle Incisors, 7 years; Two Lat. Incisors, 8 years; First Bicuspids, 9 to 10 years; Second Bicuspids, 10 to 11 years; Canine, 11 to 12 years; Second Molars, 12 to 14 years; Wisdom, 17 to 21 years.

The teeth of the lower jaw usually precede those of the upper jaw by one or two months.

DISINFECTANTS.

The disinfectants to be used are: *first*, roll sulphur for fumigating the house, furniture, bedding, etc., at least two pounds for every ten square feet of area; *second*, sulphate of iron (copperas) dissolved in water in the proportion of 1 1-2 lbs. to the gallon, for fœcal matters, sewers, etc.; *third*, sulphate of zinc and common salt, dissolved together, (4 ozs. of each to the gallon) in boiling water, for clothing, bedding, etc. Burn sulphur in iron pans, on bricks, in tubs holding a little water, and allow room to remain closed 24 hours. Cellars, yards, etc., should be treated with copperas solution.

OBSTETRIC PROCEDURE.

Obstetric Calendar.

NINE CALENDAR MONTHS.					TEN LUNAR MONTHS.		
FROM		TO		DAYS.	TO		DAYS.
January	1	September	30	273	October	7	280
February	1	October	31	273	November	7	280
March	1	November	30	275	December	5	280
April	1	December	31	275	January	5	280
May	1	January	31	276	February	4	280
June	1	February	28	273	March	7	280
July	1	March	31	274	April	6	280
August	1	April	30	273	May	7	280
September	1	May	31	273	June	7	280
October	1	June	30	273	July	7	280
November	1	July	31	273	August	7	280
December	1	August	31	274	September	6	280

The above calendar may be read as follows: a patient has ceased to menstruate on the 1st of July; her confinement may be expected, at soonest, about the 31st of March, [*the end of nine calendar months*] or, at latest, on the 6th of April [*the end of ten lunar months*]. Another has ceased to menstruate on the 20th of January, her confinement may be expected on the 30th of September, plus 20 days, [*the end of nine calendar months*], at soonest; or on the 7th of October, plus 20 days, [*the end of ten lunar months*], at latest.

Evidences of Pregnancy.—*Presumptive.* Cessation of menstruation; morning sickness, or nausea; vomiting or profuse salivation: depraved appetite; and fretfulness. *Probable.* A sense of fulness or throbbing in the breasts, with increased tenderness; the areolæ around the nipple darker than usual, dark persons showing the variance of tint far more than the fair; granular follicles of a pale rose or flesh color around the nipple; appearance of milk on gentle pressure; the presence of sebaceous matter in the follicles; certain changes in the uterus and vagina, the os and cervix being soft and spongy, the transverse lip-like fissure being changed for a more circular form. *Positive.* Quickening, usually in the 4th month; pulsation of the fœtal heart audible in the 4th, but more distinct in the 5th month; ballottement an almost infallible sign.

Signs of Death of the Fœtus in Utero.—The mother experiences the sensation of a dead, heavy weight in the lower part of the pelvis, as if the uterus had dropped; a sense of damp coldness in the abdomen, accompanied by occasional rigors; absence of movement or pulsation in the fœtus; a flaccid abdomen; a rolling of the uterus from side to side with the position of the patient; a retraction of the umbilicus; fetid discharge from the vagina.

Signs of Threatened Abortion.—Hæmorrhage and pain, the latter coming on at regular intervals, with hardness of the uterus and dilatation of its mouth. ☞Be sure that pregnancy exists before declaring a diagnosis of threatening premature expulsion.

Signs of Labor.—*Premonitory.* An alteration in the position and form of the abdominal tumor, and sinking forward of the fundus; irritability of the bladder and rectum; contractions of the uterus, unattended by pain; relaxation of the vagina, with slight mucous discharge, occasionally tinged with blood; mental anxiety; pain in hips and loins, and increased œdema of the limbs and feet. *First Stage.* Pain, more or less severe, recurring at intervals of a quarter or half hour, or more: these pains are of a dull, heavy and prolonged character, and felt most severely in the back and loins, and reaching round to the abdomen; gradual dilatation of the os; occasionally vomiting; severe rigors; passage of the fœtal head through the os uteri. *Second Stage.* Longer pains, with shorter intervals, of a forcing or bearing-down character; the patient's face becomes congested and respiration is partially arrested; the expression is one of great excitement and exertion; the uterus and vagina appear to form one canal, the lower part of which being occupied by the head of the child; pain succeeds pain, and at length follow a sharp pain, a scream, intense mental excitement, a violent and prolonged effort, and the head of the child is born; then a few moments' rest, or the same pain may suffice to expel the child completely. As soon as the breech passes, the liquor amnii escapes in a gush, thus completing the stage. *Third Stage.* A few moments' lull, followed by a slight pain, causing a detachment and dislodgement of the placenta and its membranes; completion of labor.

Management of Natural Labor.—Trust more

to nature, and less to artifice and self; enter the lying-in room equipped with a gum-elastic male catheter, a pair of forceps, a little laudanum [deodorized], some antimonial wine, and some preparation of ergot. 2. Always empty the bladder and rectum before an obstetric operation. 3. If satisfied that labor has begun, make a vaginal examination, in order to ascertain whether the presentation is natural and all is going on well. 4. If there be any malposition of the child, turn before the rupture of the membranes, and also note the temperature and degree of moisture of the vagina; always make the examination both during, and in the interval of, a pain, carefully and without bungling. 5. After the examination, advise the patient, if agreeable, to get up, sit or walk about; do not fail to frankly explain to her the condition of affairs, and allow her refreshment, if she requires it. 6. In this, the first stage, see that a few strands of thread, or a stout ligature or tape, a pair of scissors, and a binder (1 1-2 yards of unbleached cotton, folded to about nine or ten inches wide) are got in readiness for future use. 7. If the labor is progressing well, a second examination need not be made until the patient makes efforts of expulsion, this symptom indicating full dilatation of the os and passage of the head into the vagina, and that the second stage is about to begin. 8. Now advise the patient to lie down in the position for delivery, the nurse having previously guarded the bed; do not, as a rule, leave the patient during this stage. 9. If the membranes be still entire when the head is passing into the vagina, puncture them, as they are no longer a help, and may prove a hindrance; always, however,

puncture during a pain. With the labor so far advanced be sure to support the perineum, should that part seem to be dangerously distended. 10. As soon as the head is expelled, at once see if the cord is around the neck; if so, pull down and slip it over the head and shoulders; wipe the mouth of the child with a napkin, *but make no attempt to extract the child*, should uterine action be suspended. 11. If, however, the shoulders and body do not follow after a while the birth of the head, and if signs of strangulation or apoplexy are evidenced by a livid, congested and swollen face, resort to gentle traction, and at once attempt extraction, at the same time pressing firmly upon the fundus uteri, in order to prevent hæmorrhage. 12. The child being born, and having uttered the characteristic "scream," ligature the cord about 2 1-2 inches from the child's abdomen, and again, 2 inches nearer the placenta; cut the cord about three-quarters of an inch from the first ligature. 13. Remove the child and give undivided attention to the mother; press gently upon the uterus, and grasp the organ, as it were, by one hand; then introduce the finger into the os; if the insertion of the cord can be reached, efforts of extraction are admissible. While the two forefingers of the right hand are in the vagina, gently draw the cord with the left hand in the direction of the lower part of the curve of the sacrum, or the outlet of the uterus. ☞*Don't hasten the operation.* 14. A slight pain, possibly a gush of blood, absence of pulsation in the cord, all indicate that separation of the placenta has taken place; if expulsion does not speedily follow, introduce the hand, seize hold of the placental mass, and draw it down. 15. Be sure that every portion

of the placenta has come away; by gentle pressure excite the uterus to contract, remembering that contraction is the only safe-guard against hæmorrhage. Having secured *firm* contraction, apply the binder round the body and place a pad, formed of one or two folded napkins, over the uterus. 16. Allow the patient to remain in the same position for at least an hour, and enjoin perfect quiet; subsequently, move her to the other side of the bed, remove the damp cloths, and apply a warm, dry napkin to the vulva. 17. See the patient again within 12 or at most 24 hours, and note the following points: the condition of the pulse, the state of the bladder, the character of the discharge, and the degree of uterine pain or abdominal tenderness.

Position and Presentation.—If fœtal pulsation is heard *below* a line dividing the uterus midway horizontally, *vertex*; if above that line, *breech*; if *below* and to the *left*, *first position*; if *below* and to the *right*, *second position*. If *below* 134 pulsations per minute, probably *male;* if *above*, probably *female*.

AIDS AND THERAPEUTICS.

Slow Dilatation.—Traction upon the anterior lip of the os uteri, by means of one or two fingers; walking the patient; in severe cases *chloral*, grs. xv, every twenty minutes, not exceeding three doses.

Inefficient Pains.—The first stage ought to be shortened as much as possible; therefore, if prolonged, increase the efficiency of the pains by *chloral*, grs. xx, repeated if necessary, or by *Pulv. opium*, gr. i; particu-

larly opium, if nervous excitement is present; warm water injection; passage of a gum catheter within the os uteri, and carrying it around between the child and the womb; friction and pressure over the fundus; electricity. ☞Never give *ergot* until the os is fully dilated.

After-Pains.— These indicate that the uterus is obstructed in its involution by the pressure of some foreign body, most generally a clot or a portion of the secundines. Promptly relieve them: First remove the foreign body; then apply *liniment chloroformi* to the abdomen, and administer either of the following: *Pulv. Ipecac. Comp.*, grs. x; *tinct. opii*, M xx; or the following: *Morphiæ sulph.*, gr. i; *pulv. Camphoræ, Cretæ prep., pulv. glycyrrhizæ*, aa, grs. xx. M. Give in 10 grain doses, and repeat, when required, in four hours.

Hæmorrhage.— *Post Partum.* When occurring during labor, prognosis for child is bad, and if placenta is detached, for mother also. In this latter case, deliver immediately by incising os, or dilating, or both. The application of styptic compresses; *ol. terebinth*, 10 to 20 gtts. in emulsion, every half hour; introduction of ice into the uterus, or ice water douche to abdomen; acidulated drinks; ergot hypodermically, or *per ora*, are available means to check post-partum hæmorrhage.

Fainting or Collapse.—*From Hæmorrhage.* Place the patient's head lower than the body, by first removing pillow and bolster, then raising the bed to get proper inclination; maintain this position till all danger is past; stimulants (brandy, milk, strong coffee, with tr. opii deod.) guardedly; compression of arteries of extremities.

Puerperal Convulsions.—☞Remember that these generally set in suddenly, and when least expected, like a clap of thunder, though the skillful obstetrician may anticipate them when the patient shows unusual symptoms of drowsiness, headache, noise in the head and great irritability. Bromide Potass., 30 grs., or chloral, 15 grs., or both combined, as circumstances dictate, may prove useful preventives. When a convulsion does occur, inhalation of ether or chloroform; enemata of chloral, 30 to 40 grs., per rectum. The spasm having ceased, prepare to deliver as quickly as possible; empty the bladder, if necessary, by catheter, and the rectum, if necessary, by strong purgatives, Croton oil, 1 or 2 drops, on the tongue being most efficient. Cold affusions to the head, mustard baths to feet and limbs: sinapisms along the spine. To prevent recurrence, chloral, 15 grs. by the mouth, every hour. From first to last, profound quiet.

Nourishment.—*Of the woman.* After delivery, sleep is needed; this gained, and when hunger sets in, give plenty of easily-digested, nutritive food—milk, beef, mutton, or chicken broth, gruel, toast, and then, as desired, solid articles, beefsteak, chop, game, etc. *Of the child.* Direct that infant be put to breast within *five* hours after birth; forbid the administration of sugar and water, catnip tea, or similar abominations. Should the lacteal secretion be deficient, give to the infant pure cow's milk, properly diluted, (1 to 3).

Sore Nipples.—Enjoin the utmost cleanliness, protection from pressure or injury, careful washing and drying after each time of suckling. As remedies, Tr. Ben-

zoini Com.; Sol. Boracis (1 gr. to Aqua oz.i); tr. Myrrhæ; Also the following:—Ext. Opii Aq., dr. i; Liq. Plumbi Diacetat Dil. dr. iv, Aquæ Rosæ, ʒ 1-2 oz. Ft. lotion. Apply on one or two thicknesses of linen. ☞Always direct nurse to sponge off any of these preparations with warm water, prior to permitting child to suckle.

External Measurements of Normal Pelvis.

Tub'osity ischii to post. sup. spin. proc. op. side, 6 1-2 in.
Ant. sup. spin. process to do., 7 3-4 in.
Trochanter major to do., 8 1-4 in.
Ant. sup. spin. proc. to spine last lumb. vertebra, 6 3-4 in.
Symph. pubis to post. sup. spin. proc. same side, 6 1-4 in.

A variation of one-half an inch, in any *two* measurements, from those above given, indicates deformity.

Internal Diameters of Normal Pelvis.

These measurements are the *mean* of those given by twenty of the leading foreign and American authors.

INLET: Antero-post.,	4.16,	generally given at		4 in.
Transverse,	5.08,	"	"	5
Oblique,	4.79,	"	"	5
OUTLET: Transverse,	4.15,	"	"	4
Antero-posterior,	4.16,	"	"	4
Oblique,	4.41,			

The antero-posterior diameter of outlet is increased from one-half to one inch, and the oblique one-fourth inch, by the mobility of the coccyx.

Diameters of Fœtal Head at Term.

These measurements are the *mean* of those given by nine of the leading foreign and American authors.

Occipito-frontal, 4.50 in.	Biparietal, 3.61 in.
Occipito-mental, 5.16 in.	Trachelo-bregmatic,
Fronto-mental, 3.68 in.	3.75 in.
Bitemporal, 3,04 in.	Suboccipital, 3.50 in.

Shortest Diameter Allowing Embryotomy.

2 1-2 in.—Busch (2 1-4), Churchill, Meigs.

2 1-8 in.—Bedford, Cazeaux, Dubois.

2 in.—Dewees, Hull, Jacquemier, Burns?, Campbell?.

1 1-2 in.—Barlow, Hamilton, Osborn, Ramsbotham.

Size of Fœtus at Different Periods.

1st. mo. *ovum* the size of pigeon's egg.

2nd. " size of hen's; embryo 1. 2 in. long; weight 62 gr.

3rd. " size of goose's; embryo 2.7 to 3.5 in. long; 310 gr.

4th. " *fœtus* 6.6 in. long; weight, 1,860 gr; sex determinable.

5th. " length, 7 to 10.3 in. ; weight, 4,400 gr.

6th. " length, 11 to 13 in. ; weight, 9,827 gr.

7th. " length, 13 to 15 in.; wt. 49 oz.; may live few days.

8th. " length, 15 to 17 in.; weight, 64 oz.

9th. " length, 16 to 17 in.; weight, 96 oz.

Term, length, 20 in.; weight, 7 lbs.

Smallest Antero-Posterior Diameter Admitting Passage of a Living Child at Term.

3 1-2 in.—Burns, Clarke, Ray.

3 in.—Aitken, Bedford, Burch, Cazeaux, Davis, Denham, Meigs, Osborn, Ramsbotham.

2 3-4 in.—Barlow, Bush, Hamilton.

TABLES

OF

WEIGHTS, MEASUREMENTS

AND

ABBREVIATIONS.

Average Weights (avoir.) of the Organs of the Body.

(From Quain and Sharpey's Anatomy,)

	Male.	Female.
Brain,	49 1-2 ozs.	44 ozs.
Cerebrum,	43 ozs., 15 drs.	38 ozs., 12 drs.
Cerebellum,	5 ozs., 4 drs.	4 ozs., 12 1-4 drs.
Pons and Medulla,	15 3-4 drs.	1 oz., 1-4 dr.
Spinal Cord,	1 oz., 4 drs.	1 oz., 4 drs.
Heart,	11 ozs.	9 ozs.
Lung, (right)	24 ozs.	17 ozs.
" (left)	21 ozs.	15 ozs.
Thyroid,	1 oz.	2 ozs.
Liver,	53 ozs.	45 ozs.

Pancreas,	3 ozs.	3 ozs.
Spleen,	6 ozs.	5 ozs.
Kidney,	5 1-2 ozs.	5 ozs.
Suprarenal Capsule,	1 dr. to 2 drs.	1 dr. to 2 drs.
Prostate,	6 drs.	
Testis,	1 oz.	
Uterus, (virgin),		7 drs. to 12 drs.
Ovary,		1 dr. to 1 1-2 dr.

Weights and Measures.

The weights and measures adopted in the U. S. Pharmacopœia are those which should always be employed in writing prescriptions. There is another system, however viz.: the Metric, which has many advantages peculiar to itself, and which is now coming into such general use that an acquaintance with it is necessary to every educated physician. The weights of the former system are derived from the Troy pound, and are as follows:

APOTHECARIES', OR TROY, WEIGHT.

Pound.		Ounces.		Drachms.		Scruples.		Grains.
lb. 1	=	12	=	96	=	288	=	5760
		℥1	=	8	=	24	=	480
				ʒ1	=	3	=	60
						℈1	=	20

APOTHECARIES' OR WINE MEASURE.

Gallon.		Pints.		Fluidounces.		Fluidrachms.		Minims.
C. 1	=	8	=	128	=	1024	=	61440
		O1	=	16	=	128	=	7680
				f℥1	=	8	=	480
						fʒ1	=	M60

Approximate Measures.

1 minim varies from		1 to 2 drops.
1 fluidrachm	equals, about,	1 teaspoonful.
2 fluidrachms	" "	1 dessertspoonful.
4 fluidrachms	" "	1 tablespoonful.
2 fluidounces	" "	1 wine glass.
4 fluidounces	" "	1 teacup.

The French or Metric System

Has as its unit the Meter (39.37 inches), which is the ten millionth part of the distance from the pole to the equator. From this as a basis all other measures and weights are formed. The system is arranged on a decimal scale,—that is, all the divisions are connected by the multiple ten, in exactly the same way as tbe coins in the U. S. monetary system. The names given to the different divisions and multiples of the unit are formed in each case by a certain prefix, derived from the Latin or Greek, which is placed before the name of the unit. It is the custom in all countries where the metric system is used, in writing prescriptions, to express all quantities by weight, fluids as well as solids being expressed in this way. We have only to do, then, with the *gram* and its decimal divisions, that being the name given to the unit of weight. A *gram* is the weight of *one cubic centimeter* of water at 39° Fahr. The subdivisions of the gram are as follows:

1 gram=weight of 1 cc. water at 39° F.	written	1.
1 decigram=1-10 of a gram	"	.1
1 centigram=1-100 "	"	.01
1 milligram=1-1000 "	"	.001

In practice, the decigram is disregarded, and everything expressed in terms of *grams* and *centigrams;* in the same way as we disregard our dimes and express money-values in terms of dollars and cents. In writing prescriptions for solids, then, one has only to know the dose in terms of grams, the mathematical calculation being practically the same as when the apothecaries' weight is employed, only simplified by the use of the decimal system.

TABLE OF APPROXIMATIONS.

Apothecaries'.		Grams (nearly).		Grams (exactly).
Grain i,	=	.06	or	.06479
℈i,	=	1.30	"	1.2958
ʒi,	=	4.	"	3.8874
℥i,	=	31.	"	31.103

From the preceding table may be easily deduced the following

RULES FOR EXPRESSING QUANTITY BY WEIGHT OF THE APOTHECARIES' SYSTEM IN METRIC TERMS.

RULE I.—*Reduce the quantity to grains and divide by 15; the quotient expresses the same quantity* [*nearly*] *in grams.*

RULE II.—*Reduce the quantity to drachms and multiply by 4; the product represents* [*nearly*] *the same quantity in grams.*

RULE III.—*Reduce each quantity to ounces and multiply by 31; the product represents* [*nearly*] *the same quantity in grams.*

In changing *fluid measures to grams* the same rules may be employed to get results accurate enough for all

practical purposes. But if greater exactness is required, it must be remembered that one gram of water measures about 16 minims [exactly 16.231]; consequently, [1 fluid-ounce of water weighs 455.7 grs.],—

1 minim,	=	.06 grams, exactly	.0616
1 f℥	=	3.70 " "	3.696
1 f℥	=	30. " "	29.576

French System of Length.

1 millimeter	equals	.039368	of an inch.
1 centimeter	"	.39368	" " "
1 decimeter	"	3.9368	inches.
1 meter	"	39.368	"
1 dekameter	"	393.68	"
1 hektometer	"	3,936.8	"
1 kilometer	"	39,368.	"
1 myriameter	"	393,680.	"

French System of Weight.

1 centigram	equals	.15434	of a grain.
1 decigram	"	1.5434	grain.
1 gram	"	15.434	grains.
1 dekagram	"	154.34	"
1 hektogram	"	1,543.4	"

French System of Measures.

1 milliliter	equals	16.231 minims	or 15.434	grains.
1 centiliter	"	2.705 f℥	154.34	"
1 deciliter	"	3.381 f℥	1,543.4	"
1 liter	"	2.113 pints	15,434.	"
1 dekaliter	"	2.641 C.	154,340.	"
1 hektoliter	"	26.412 C.	1,543,400.	"
1 kiloliter	"	264.12 C.	15,434,000.	"
1 myrialiter	"	2,641.2 C.	154,340,000.	"

Temperature.

1°Fahrenheit=5-9° Centigrade=4-9° Reaumur. *To Reduce F. to C.:* subtract 32° from the F. degrees given, and divide the remainder by 1.8. *To Reduce C. to F.:* multiply the C. degrees given by 1.8 and then add 32° to this product.

Rule For Apportioning Doses.

Given the dose for an adult, the dose for a child is obtained by dividing the number of the following birthday by 24. For example: The dose for an adult is 16 grains; for a child of two years of age $=\frac{3}{24}=\frac{1}{8}$; 1-8th of 16 is 2 (grains).

Table of Drops in a Fluid Drachm.

Acid Hydrocyanic, dilut., 45; Acid Sulphuric, Aromat., 116-148; Acid Sulphur., dilut., 49-54; Ether, 150; Alcohol, 120-143; Chloroform, 180-276; Liq. Potass. Arsenit., 59-63; Acetum Opii., 70-90; Ol. Carui, 106-108; Ol. Ricini, 55; Syrupus Scillæ, 85; Tinct. Aconiti Rad., 118-130; Tinct. Ferri Chloridi, 106-151; Tinct. Opii, 106-147; Tinct. Opii, Camph., 95-110.

Table of Abbreviations.

ȧȧ., *ana*, of each.

Ad 2 D., *ad duas doses*, at two doses.

Add, *adde*, add.

Ad., *ad*, up to.

Aq. Destil., *aqua destillata*, distilled water.

Aq. Ferv., *aqua fervens*, hot water.

C., *congius*, gallon.
CAP., *capiat*, [let patient] take it.
CHART., *chartula*, a powder.
COCH. MAG., *cochleare magnum*, tablespoonful.
COCH. MED., *cochleare medium*, dessertspoonful.
COCH. PARV., *cochleare parvum*, teaspoonful.
COL., *cola*, strain or filter.
COLLYR., *collyrium*, eye-wash, or eye-drops.
COMP., *compositum*, compounded or compound.
D., *dosis*, dose.
DECOCT., *decoctum*, decoction.
DIL., *dilue*, dilute; *dilutus*, diluted.
DIM., *dimidia*, one-half.
DIV., *divide*, divide.
ELEC., *electuarium*, electuary.
ENÈM., *enema*, enema.
FT., *fiat*, make.
FT. H. (or HAUST), *fiat haustus*, let a draught be made.
GARG., *gargarisma*, gargle.
HAUST., *haustus*, a draught.
INF., *infunde*, pour in or into.
INFUS., *infusio*, infusion.
INJ., *injiciatur*, inject.
M., *misce*, mix.
MIST., *mistura*, mixture.
MIC. PAN., *micæ panis*, crumbs of bread.
NO., *numero*, in number.
O., *octarius*, a pint.
POCUL., *poculum*, a cup.
P. R. N., *pro rê nata*, as symptoms demand.
PULV., *pulvis*, powder.

AQ. FLUV., *aqua fluvialis*, river water.
AQ. FONT., *aqua fontana*, spring water.
BULL., *bulliat*, boil it.
Q. P., *quantum placeat*, as much as you please.
Q. S., *quantum sufficiat*, a sufficient quantity.
℞, *receipe*, take.
REDIG. IN PULV., *redigatur in pulverem*, pulverize.
S. or SIG., *signa*, write.
S. A., *secundem artem*, according to art.
SIGN., *signatio*, a label.
T. i. d., *ter in die*, three times a day.
TRIT., *tritura*, triturate.
TROCH., *trochiscus*, lozenge.

The Pulse at Various Ages.

AGE.	Pulsations per Minute.	
	Sommering.	Muller.
In the embryo,	—	150
At birth,	—	150
One month,	—	———
One year,	120	115–130
Two years,	110	100–115
Three years,	90	90–100
Seven years,	—	85– 90
Twelve years,	—	———
Puberty,	80	80– 85
Adult age,	70	70– 75
Old age,	60	50– 65

In general, the pulse is more frequent (about 5 pulsations increase) in females and irritable persons than in males and those of an opposite temperament.

POSOLOGY.

Doses of Drugs for Internal Administration.

REMEDY.	Apoth. Wt.	Grams.
Acid. Arseniosum, *arsenic*,	gr. 1-20th to 1-10th	.002– .006
Carbolicum,	gr. i-ii	.05– .15
Benzoic,	gr. x-xxx	.60– 2.
Boracic,	gr. v-x	.30– .60
Gallicum,	gr. v-xx	.30– 1.
Hydrocyanicum, dilut.,	gtts. i-vi	.06– .36
Muriaticum, dilut.,	gtts. v-xx	.30– 1.30
Nitricum, dilut.,	gtts. v-xxv	.30– 1.50
Nitromuriaticum, dilut.,	gtts. v-℥ss	.30– 2.
Oxalicum,	gr. ¼-i	.015– .06
Phosphoricum Glaciale,	gr. i-ii	.05– .15
Phosphoricum, dilut.,	gtts. v-℥i	.30– 3.75
Salicylicum,	gr. vii-℥i	.50– 4.
Sulphuricum, dilut.,	gtts. v-xx	.30– 1.20
Sulphuricum, aromat.,	gtts. v-xxv	.30– 1.50
Tannicum,	gr. i-xx	.05– 1.25
Aconiti, extractum,	gr. ¼-i	.02– .06
Aconiti radicis, tinctura,	gtts. ½-vi	.03– .30
Æther, *fortior*,	gtts. v-℥i	.25– 3.50
Ætheris, spiritus comp.,	℥ss-ii	1.70– 7.
Ætheris, spiritus Nitrosi,	℥ss-iv	1.70–13.
Aloe Socotrina,	gr. ss-x	.03– .60
Aloe et Canella,	gr. v-xxx	.30– 2.
Aloës, tinctura,	℥i-ii	4. – 8.
Aloës, vinum,	℥i	4.

REMEDY.	Apoth. Wt.	Grams.
Alumen, [expectorant]	gr. v-xxx	.30– 2,
Ammoniæ Acetatis, liquor,	℥i-℥i	4. –30.
Ammoniæ Carbonas,	gr. ii-x	.15– .65
Ammoniæ, spiritus aromat.,	℥ss-ii	2. – 8.
Ammoniaci, mistura,	℥ss-i	15. –30.
Anthemis,	℥ss-i	2. – 4.
Antimonii Sulphuretum,	gr. i-v	.06– .30
Antimonii Oxidum,	gr. i-iii	.06– .20
Antimonii et Potassæ Tartras, [emetic],	gr. i-ii	.05– .15
Antimonii et Potassæ Tartras, [diaphoretic],	gr. 1-12th to 1-6th	.005– .01
Antimonii, vinum,	gtts. v-℥i	.30– 4.
Antimonialis, pulvis,	gr. iii-x	.20– .65
Apomorphia,	gr. 1-20th to 1-16th	.004– .005
Argenti Nitras,	gr. 1-6th-i	.01– .06
Argenti Oxidum,	gr. ss-ii	.03– .12
Arnica, extractum,	gr. v-xv	.30– 1.
Arsenici Iodidum,	gr. 1-20th to 1-10th	.004– .006
Arsenici et Hydrargyri Iodid., liquor,	gtts. i-x	.05– .60
(Potassæ Arsenitis, liquor), Fowler's Sol.,	gtts. i-x	.05– .60
(Sodii Arseniatis, liquor), Pearson's Sol.,	gtts. iii-x	.15– .50
Assafœtida,	gr. v-xv	.30– 1.
Assafœtidæ, tinctura,	℥ss-i	2. – 4.
Atropiæ Sulphas,	gr. 1-80th to 1-50th	.0008–.0013
Balsamum Tolutanum, syrupus,	℥ss-i	20. –40.
Balsamum Tolutanum, tinctura,	℥i-ii	4. – 8.
Belladonnæ, folium,	gr. i	.05–
Belladonnæ, extractum,	gr. ⅛-½	.008– .03

REMEDY.	Apoth. Wt.	Grams.
Belladonnæ, tinctura,	gtts. v-xxx	.30– 2.
Benzoini compos., tinctura,	℥ i-ii	4. – 8.
Bismuthi Subcarbonas,	gr. x-℥ i	.60– 4.
Bismuthi Subnitras,		
Brominium,	gtts. i-iii	.06– .20
Buchu, infusum,	℥ i-ii	15. –60.
Caffeia,—Caffeiæ Citras,	gr. ss-ii	.03– .15
Calcis, liquor,	℥ i-iv	4. –16.
Calcii Chloridi, liquor,	gtts. xxx to ℥ i	2. – 4.
Creta preparata,	gr. x-xxx	.60– 2.
Camphora,	gr. ii-x	.15– .60
Camphoræ, aqua,	℥ ss-ii	15. –60.
Camphoræ, spiritus,	℥ ss-i	2. – 4.
Cannabis, extractum,	gr. ¼-i	·015– .06
Cannabis, tinctura,	gtts. v-x	.30– .60
Cantharidis, tinctura,	gtts. ii-v	.12– .30
Capsicum,	gr. i-v	.06– .30
Capsici, tinctura,	gtts. x-℥ i	.65– 4.
Cardamomi, tinctura,	℥ i-ii	4. – 8.
Cardamomi, tinct. comp.,	℥ i-iv	4. –16.
Caryophilli, oleum,	gtts. i-v	.05– .30
Catechu,	gr. x-xxx	.60– 2.
Catechu, tinctura,	℥ ss-ii	2. – 8.
Cerii oxalatis,	gr. i-iii	.06– .20
Chenopodii, oleum,	gtts. iii-x	.16– .55
Chloralis,	gr. v-xl	.30– 2.50
Chloroformi,	gtts. v-x	.30– .60
Chloroformi, spiritus,	gtts. xx-℥ i	1.20– 4.
Cimicifugæ, ext. fluidum,	gtts. xxx to ℥ i	2. – 4.
Cinchona,	gr. v-xx	.30– 1.30
Cinchonæ, extract fluid.,	gtts. v-xv	.30– 1.
Cinchonæ, tinctura,	℥ ss-ii	2. – 8.
Cinchonæ, tinctura compos.,	℥ i-ii	4. – 8.

REMEDY.	Apoth. Wt.	Grams.
Cinchoniæ Sulphas,	gr. i-xxx	.06– 2.
Cinnamomi, spiritus, } Cinnamomi, tinctura, }	℥i-ii	4. – 8.
Colchici radicis, extract. fl.,	gtts. ii-iv	.10– .25
Colchici radicis, vinum,	gtts. v-xv	.30– 1.
Colchici seminis, ext. flu.,	gtts. ii-vi	.10– .30
Colchici, tinctura, } Colchici seminis, vinum, }	℥ss-i	2. – 4.
Colocynthidis, comp. ext.,	gr. ii-xv	.13– 1.
Conii, fructus, ext. fluid.,	gtts. xv-℥i	1. – 4.
Copaibæ, oleum,	gtts. v-xx	.30– 1.
Copaibæ, resina,	gr. v-x	.30– .60
Creasoti,	gtts. i-ii	.05– .10
Creasoti, aqua,	℥i-ii	4. – 8,
Croci,	gr. x-xxx	.60– 2.
Cubebæ, (powder),	℥ss-i	2. – 4.
Cubebæ, oleoresina, } Cubebæ, oleum, }	gtts. v-xxx	.30– 2.
Cubebæ, tinctura,	℥ss-ii	2. – 8.
Cupri Sulphas,	gr. 1-6th-ss	.01– .03
Cupri Ammoniatum,	gr. 1-6th-i	.01– .06
Damianæ, ext. fluid.,	℥i-iii	4. –12.
Digitalis, powder,	gr. ss-ii	.03– .20
Digitalis, tinctura, (8m.=1gr.)	gtts. iv-℥½	.20– 1.50
Digitalis, ext. fluidum,	gtts. ss-iii	.03– .20
Dulcamaræ, ext. fluid.,	℥ss-ii	2. – 8.
Ergotæ, in powder,	℥ss-i	2. – 4.
Ergotæ, ext. fluidum,	℥ss-i	2. – 4.
Ergotæ, vinum,	℥ii-iv	8. –.16
Ergotæ, extract., (Squibb's), } Ergotine, (Bonjean's), }	gr. v-x	.30– .60
Eucalypti Globuli, tinctura,	℥ss-ii	2. – 8.
Eucalypti, oleum,	gtts. v-xx	.30– 1.30
Eupatorii, infusum,	℥i-ii	30. –60.
Ferri Chloridi, tinct.,	gtts. v-℥ss	.30– 2.

REMEDY.	Apoth. Wt.	Grams.
Ferri Citras,	gr. ii-v	.15– .30
Ferri et Ammon. Citras,	gr. ii-v	.15– .30
Ferri et Ammon. Sulph.,	gr. i-ii	.06– .15
Ferri et Ammon. Tartras,	gr. v-x	.30– .60
Ferri et Potassæ Tartras,	gr. v-x	.30– .60
Ferri et Quiniæ Citras,	gr. v-x	.30– .60
Ferri liquor dialysat.,	gtts. v-xv	.30– 1.
Ferri Ferrocyanid.,	gr. iii-v	.20– .30
Ferri Iodidi, syrup.,	gtts. x-xxx	.60– 2.
Ferri Lactas,	gr. ii-x	.15– .60
Ferri Nitratis, liquor,	gtts. ii-x	.10– .60
Ferri Phosphas,	gr. ii-v	.15– .30
Ferri Pyrophosphas,	gr. ii-v	.15– .30
Ferri Subcarb.,	gr. v-xv	.30– 1.
Ferri Sulph., exsiccat.,	gr. ss-ii	.03– .10
Ferri Valerianas,	gr. i-ii	.06– .12
Ferri, vinum,	℥ ss	16.
Ferrum Ammoniat.,	gr. v-x	.30– .60
Ferrum redactum,	gr. ss-iii	.03– .20
Felix mas., oleum,	gtts. x-℥ i	.60– 4.
Gallæ, tinctura,	℥ i-ii	4. – 8.
Gambogiæ,	gr. i-iii	.06– .20
Gelsemii, ext. fluid.,	gtts. v-x	.30– .60
Gentianæ, extractum,	gr. ii-x	.13– .60
Gentianæ, ext. fluid.,	gtts. x-xx	.60– 1.20
Gentianæ, tinct. comp.,	℥ i-ii	4. – 8.
Guarana, pulv.,	gr. xx-℥ i	1.20– 3.50
Guaiaci, resina,	gr. x-xxx	.60– 2.
Guaiaci, tinctura, / Guaiaci, tinct. ammon.,	℥ ss-ii	2. – 8.
Hæmatoxyli, extractum,	gr. x-xx	.60– 1.30
Hæmatoxyli, decoctum,	℥ i-ii	30. –60.
Hammamelis, tinctura,	gtts. ii-xii	.10– .60
Hellebori, extractum,	gr. v-x	.30– .60
Hellebori, tinctura,	℥ i-ii	4. – 8.

REMEDY.	Apoth. Wt.	Grams.
Humuli, tinctura,	℥ ss-i	16. –32.
Humuli, infusum,	*ad. lib.*	
Hydrarg. cum Creta, (gray pulv.)	gr. v-xxv	.30– 1.50
Hydrarg. pilulæ, (1 pill = 3 grs.)	1 to 2 pills	
Hydrarg. Chlorid. Mite, [Calomel],	gr. ss-xx	.03– 1.30
Hydrarg. Chlorid., corros.,	gr. 1-30th to 1-10th	.002– .006
Hydrarg. Cyanid.,	gr. 1-20th to 1-8th	.003– .007
Hydrarg. Iodidi Viridi.,	gr. 1-5th-i	.012– .06
Hydrarg. Iodidi, rub.,	gr. 1-30th to 1-10th	.002– .024
Hydrarg. Oxid., nig., Hydrarg. Sulph., flava., Hydrarg. Sulphuret., nig., Hydrarg. Sulphuret., rub.,	extr'l use only,	
Hyoscyami, folia,	gr. v-x	.30– .60
Hyoscyami, extr.,	gr. 1-6th-ii	.001– .15
Hyoscyami, extr. fluid.,	gtts. v-℥ ss	.30– 2.
Hyoscyami, tinctura,	℥ ss-iv	2. –15.
Ignatiæ, extr. alcohol.,	gr. 1-6th to ½	.01– .03
Iodinum,	gr. ss-i	.03– .06
Iodini, tinct.,	External use only.	
Iodini, tinct. comp.,	gtts. ii-x	.12– .60
Iodini, liquor comp., [Lugol's Sol.],	gtts. iii-x	.18– .60
Ipecacuanha,	gr. i-xxx	.06– 2.
Ipecacuanhæ, syrupus, Ipecacuanhæ, vinum,	gtts. xv to ℥ ii	1. – 8.
Ipecacuanhæ, ext. fluid.,	gtts. i-xxx	.06– 2.
Ipecacuanhæ, pulv. comp.,	gr. v-xv	.30– 1.
Jaborandi, folia,	℥ i-ii	4. – 8.
Jalapa,	gr. v-xx	.30– 1.30

REMEDY.	Apoth. Wt.	Grams.
Jalapæ, resin.,	gr. ii-iv	.13– .29
Jalapæ, tinctura,	℥ ss-i	2. – 4.
Juglandis, extract.,	gr. v-xxx	.30– 2.
Juniperi, infusum,	℥ ii-viii	60. –250.
Juniperi, oleum,	gtts. ii-v	.10– .25
Juniperi, spir. comp.,	℥ i-iv	4. –15.
Kino [in powder],	gr. v-xxx	.30– 2.
Kino, tinctura,	℥ i-ii	4. –15.
Krameria,	gr. x-xx	.60– 1.30
Krameriæ, ext.,	gr. v-x	.30– .60
Krameriæ, syrupus,—K. tinctura,	℥ i-iv	5. –20.
Lactucarium,	gr. x-℥ i	.60– 4.
Lactucarii, syrupus,	℥ ss	16. –
Lavandulæ, oleum,	gtts. i-v	.05– .30
Lavandulæ, spirit. comp.,	℥ i-iv	4. –16.
Lobeliæ, tinctura,	gtts. v-℥ i	.30– 4.
Magnesiæ, [calcined,]	℥ ss ii	2. – 8.
Magnesiæ Carbonas,	℥ ss-℥ i	2. –30.
Magnesiæ Citratri, liquor,	℥ ii-xii	60. –400.
Magnesiæ Sulphas,	℥ ii-℥ i	10. –30.
Manganesii Oxidum,	gr. ii-x	.13– .60
Manganesii Iodid., liquor,	gtts. x-xx	.60– 1.20
Manganesii Sulph.,	gr. ii-x	.13– .60
Manna,	℥ i-viii	4. – .32
Matico, } Matricaria, }	℥ ss-i	2. – 4.
Menthæ Pip., oleum,	gtts. i-vi	.05– .40
Menthæ Pip., spiritus,	gtts. v-xxx	.30– 2.
Menthæ Pip., aqua, } Menthæ Virid., aqua, } as a vehicle.		
Menthæ Virid., spiritus,	gtts. v-xxx	.30– 2.
Mistura Cretæ,	℥ ss-i	16. –32.
Morphiæ Acetas, } Morphiæ Murias, } Morphiæ Sulphas, }	about gr. 1-6th.	.01

REMEDY.	Apoth. Wt.	Grams.
Morphiæ, Sulph., liquor, (U S.,)	℥i-iv	4. –16.
Morphiæ Sulph., liq., (Magen-die's,)	gtts. ii-xv	.10– 1.
Moschi,	gr. v-xxx	.30– 2.
Myrrhæ, tinctura,	℥ ss-i	2. – 4.
Nucis Vom., ext., alcohol.,	gr. ¼-½	.015– .03
Nucis Vom., tinctura,	gtts. ii-x	.12– .60
Nux Vomica,	grs. iii-v	.18– .30
Ol. Morrhuæ,	℥i-iv	3.50–15.
Ol. Olivæ,	℥i-iv	30. –125.
Ol. Ricini,	℥ii-viii	8. –30.
Ol. Tiglii,	gtts. ss-ii	.03– .12
Opium,	gr. ss-ii	.03– .15
Opii Acetum, (black drop,)	gtts. v-x	.30– .60
Opii, extract.,	gr. ss	.03
Opii, tinctura,	gtts. xxv	1.50
Opii, tinctura Acetata,	gtts. xx	1.20
Opii, tinctura Camphorat.,	℥ ss	15.
Opii, tinct. Deodorata,	gtts. xxv	1.50
Opii, vinum,	gtts. xx	1.20
Pareiræ, ext. fluid.,	℥ ss-i	2. – 4.
Petroleum,	℥ ss-i	2. – 4.
Phosphorus,	gr. 1-50th to 1-20th	.0012– .003
Physostigmæ, extract.,	gr. 1-6th-i	.01– .06
Pilocarpin nitrat.,	gr. 1-6th-⅓	.01– .02
Piper, oleo-resin.,	gtts. i-iii	.06– .18
Plumbi Acetas (sugar of lead),	gr. ½-iii	.03– .18
Plumbi Iodidum,		
Plumbi Nitras,	gr. ¼-½	.015– .03
Podophylli, extract.,	gr. v-xv	.30– 1.
Podophylli, resina,	gr. 1-12th to ½	.005– .02
Potassæ, liquor,	gtts. v-xx	.30– 1.30
Potassii Acetas,	gr. x-xx	.60– 1.20

REMEDY.	Apoth. Wt.	Grams.
Potassii Bitart.,	gr. x-℥ ii	.30– 8.
Potassii Carbonas, pura,	gr. v-xxx	.30– 2.
Potassii Bicarb.,	gr. x-℥ i	.60– 4.
Potassii Chloras,	gr. v-xxx	.30– 2.
Potassii Citras,	gr. v-xxx	.30– 2.
Potassii Citratis, liquor,	℥ ss	15.
Potassii Nitras,	gr. v-x	.20– 1.30
Potassii Tartras,	gr. x-℥ i	.60– 4.
Potassii Bromidum,	gr. v-℥ i	.30– 4.
Potassii Cyanid.,	gr. ⅛	
Potassii Iodidum,	gr. v-x	.30– .60
Pruni Virginianæ, extr. fluid.,	℥ ss-i	2. – 4.
Pruni Virgin., infusum,	℥ ii	60.
Pulsatillæ, tinctura,	gtts. ½-v	.03– .30
Pulvis Aromatic.,	gr. x-xx	.60– 1.20
Quassiæ, ext.,	gr. ss-iii	.03– .20
Quassiæ, tinctura,	℥ i-ii	4. – 8.
Quiniæ Sulphas, } Quiniæ Valerianas, }	gr. i-xx	.06– 1.20
Quiniæ et Ferri Citras,	gr. iii-v	.18– .30
Rheum,	gr. i-xxx	.06– 2.
Rhei, ext. fluid.,	gtts. xxx	2.
Rhei, syrupus aromat.,	℥ i-ii	30. –60.
Rhei, tinctura,	℥ i-iv	4.–16.
Sabina,	gr. v-xv	.30– 1.
Sabinæ, oleum,	gtts. i-v	.05– .30
Salicin,	gr. v-xxx	.30– 2.
Salicylic Acid,	gr. vii-℥ i	.50– 4.
Salicylate Sodæ,	gr. xv-℥ i	1. – 4.
Sanguinariæ, tinctura,	gtts. xv-xxx	1. – 2.
Santonin,	gr. i-v	.06– .30
Scammonium,	gr. v-xv	.30– 1.
Scammonii, resin.,	gr. ii-x	.13– .60
Scillæ Acetum,	gtts. v-℥ ss	.30– 2.
Scillæ, syrupus,	℥ ss-i	2. – 4.

REMEDY.	Apoth. Wt.	Grams.
Scillæ, syrupus co.,—S. tinctura,	gtts. v-℥ ss	.30– 2.
Senegæ, syrupus,	℥ i-ii	.30– .60
Senegæ, ext.,	gr. i-iii	.06– .18
Serpentariæ, tinctura,	℥ i-ii	4. – 8.
Sodii Acetas,	gr. x-℥ i	.60– 4.
Sodii Carbonas,—S., Boras, Sodii Bicarbonas,	gr. v-xxx	.30– 2.
Sodii Phosphas,	gr. xx-℥ ii	1.30–60.
Sodii Sulphas,	℥ ss-i	15. –30.
Sodii et Potassii Tartras,	℥ ii-iv	8. –16.
Stramonii, folia,	gr. i-ii	.06– .12
Stramonii, ext.,	gr. ¼-i	.015– .06
Stramonii, tinctura,	gtts. v-xx	.30– 1.30
Strychnia,	gr. 1-60th to 1-20th	.001– .003
Sulphur,	gr. xx-℥ ii	1.20– 8.
Taraxaci, ext.,	gr. xx-℥ i	1.20– 4.
Taraxaci, ext. fluid.,	℥ i-ii	4. – 8.
Terebinthinæ, oleum,	gtts. x-℥ i	.50– 4.
Uva Ursi, ext. fluid.,	℥ ss-i	2. – 4.
Valerianæ, ext. fluid.,	℥ i	4.
Valerianæ, tinctura,	℥ i-ii	4. – 8.
Veratri Viridis, ext. fluid.,	gtts. i-v	.06– .30
Veratri Viridis, tinctura,	gtts. ii-vi	.13– .40
Veratria,	external	use.
Yerbæ Santæ, ext. fluid.,	gtts. xv-℥ i	1. – 4.
Zinci Acetas,	gr. i-ii	.06– .12
Zinci Chloridi,	gr. ¼-ii	
Zinci Oxidum,	gr. i-v	.05– .30
Zinci Phosphidum,	gr. 1-12th to ½	.005– .02
Zinci Sulphas,	gr. x-xx	.60– 1.30
Zinci Valerianas,	gr. ss-ii	.03– .13
Zingiberis, tinct.,	gtts. xx-℥ i	1.30– 4.
Zingiberis, ext. fluid.,	gtts. v-xv	.30– 1.

Cautionary Facts.

1.—Drugs by the rectum or vagina should be given in *three* [3] times the dose by the mouth.

2.—Drugs by the hypodermic method should be given in *one-sixth* [1-6th] the dose by the mouth.

3.—Be cautious in giving *atropia* to flaxen-haired, light-complexioned, nervous women.

4.—Be cautious in the use of *morphia* subcutaneously after opiates or morphia have been given by the mouth or rectum.

5.—*Chloral hydrate* should be exhibited with great care.

6.—Remember that children are especially susceptible to the narcotic action of opium and its alkaloids.

Doses of Drugs for Atomization, Inhalation, etc.

Proportion to Aqua ℥i.

Acid. tannic.,	grs. v-xv.
" Sulphurous, dilut.,	gtts. x-xx.
" Carbolic.,	gtts. x-xx.
" Cresylic.,	gr. xl.
" Salicylic.,	gr. xv-xxx.
" Citric.,	℥i.
Acetate of Lead,	gr. i-xxx.
Alum,	gr. v-xxv.
Ammoniæ Murias,	gr. v-x.
Argenti Nitrat.,	gr. i-x.
Aqua Calcis,	undiluted.
Aqua Menth. Pip.,	"

Belladonnæ, tinctura,	gtts. xv-xxx.
Cannabis Indica, tinct.,	gtts. iij-xv.
Cupri Sulph.,	gr. i-xv.
Hammamelis, tinctura,	gtts. xx.
Hydrastis Canad., fluid. extr.,	gr. xxx.
Hyoscyamus, fluid. extr.,	gr. xxx.
Ipecac., fluid. extr.,	gtts. xx.
Liquor Sodii Arseniatis,	gtts. v-x.
Morphiæ Sulphas,	gr. ss-iss.
Morphiæ Acetas,	gr. ss-iss.
Opii, deodorat. tinct.,	gtts. xx-xxx.
Potassii Chloras,	gr. x-xx
Potassii Permanganat.,	gr. v-x
Picis liquid. infus.,	℥ss.
Terebinth., oleum,	gtts. v-x.
Zinci Sulphas,	gr. iij-xv.

Doses of Drugs for Subcutaneous Injection.

Acid. Hydrocyanic., dilut.

Acid. Hydrocyan., dil., gtts. vj; Aq. destil., ℥j.

Dose, gtts. x-xxx.

Aconit. Rad., tinct.

Tr. Aconit. Rad., gtts. vj; Aq. destil., ℥ij.

Dose, gtts. x-xx.

Ammonia.

Aq. Ammon., fort., gtts. xx; Aqua destil. ℥ij.

Dose. gtts. xxx.

Apomorphia.

Apomorphia, gr. ss; Aqua destil., ℥j.

Dose, gtts. vj-x.

Atropiæ Sulph.

Atropiæ Sulph., gr. ij; Aqua destil., ℥j.

Dose, gtts. v-x.

Useful in poisoning by opium; 1-24th of a grain antidoting gr. j morphia or gr. vj of opium.

Caffein.

Caffein, gr. x; Aqua destil., ℥j.

Dose, gtts. v-xx.

Conia.

Coniæ, gr. 1-4; Spiriti, ℥ss; Aq. destil., ℥iss.

Dose, gtts. iij-xij.

Digitalin.

Digitalin., gr. ss; Chloroformi, ℥ss; Aq. destil., ℥iss.

Dose, gtts. v-xv.

Ergotin.

Ergotin., (Aq. ext.) gr. xl; Aq. destil., ℥ij.

Dose, gtts. v-xx.

Morphia (Keyes').

Morphiæ Sulph., gr. xvi; Acid. Salicylic., gr. ss; Aqua destil., ℥j.

Dose, gtts. iii-x.

Morphia.

Morphiæ Acetas, gr. ij; Acid. acetic, gtts. j; Aqua destil., ℥j. M. et add.: Liquor Potassæ, gtts. j.

Dose, gtts. iv-x.

Morphia et Atropia.

Morph. Sulph., gr. xvj; Atropiæ Sulph., gr. ½; Glycerin., ℥i; Acid. Carbol., gtts. v; Aqua. distil., ℥viij. M. et filter.

Dose, gtts. iv-xij.

Quiniæ Sulphas.

Quiniæ Di-sulph., gr. xl; Acid. Sulph., dilut., gtts. 100;
Aq. destil., ℥j; Acid. Carbol., liq., gtts. v.

Solve.

Put the quinine and water in a porcelain dish over a spirit lamp; heat to boiling point, and add the sulphuric acid, stirring with a wooden spatula. Filter at once into a bottle and add the carbolic acid. This gives 6 grains to the drachm; heat when the temperature is below 50° Fah.

Strychnia.

Strychniæ Sulph., gr. i; Aqua destil., ℥ij.

Dose, gtts. v-xv.

Veratrum Viride.

Ext. Verat. Virid. fl., gr. x; Aq. destil., ℥j. M. Filter.

Dose, gtts. v-xij.

CHEMICAL INCOMPATIBILITY.

There are mainly three kinds of cases where, by improper associations, medicinal chemicals may become incompatible:

1.—When free acids are combined with hydrates or carbonates;

2.—When two or more soluble salts are associated which, by interchange of base or acid, give rise to the formation of new compounds with different properties and therapeutical action; and

3.—When chemicals are brought in contact which may give rise to sudden and vehement or explosive chemical processes.

THERAPEUTICAL PROGRESS.

1. For Tape-Worm.— *Ol. ricini*, ℥j, in the morning, followed by restricted diet during the day; next morning, *ol. ricini*, ℥ss, and an hour later, *acid. salicylic.*, gr. xij: this dose of acid repeated every hour until a full drachm has been taken; half an hour after the last dose, *ol. ricini*, ℥ss. The worm should pass early in the afternoon. After the passage, wash out the rectum with injections of warm water.—DR. RIDDER, in *Allg. Med. Cent. Zeitung.*

2. For Irritant Dentition.—Dr. Peyraud, of Paris, reports excellent results from applying the following to the gums four or five times a day. ℞—*Bromid. Potass.*, ℥j; *melis*, ℥vj; *aqua* q. s. to dissolve the salt, and *spiriti* q. s. to preserve the mass. In cases of diarrhœa caused by dentition, a few drops of Sydenham's laudanum may be added with advantage.—*Jour. de Med.*

3. For Diabetes.—The great value of opium in the treatment of this disease has suggested the use of *codeine*, in grain doses twice a day, with a large degree of advantage. In one case, the amount of sugar passed was in a fortnight reduced from half an ounce to two drachms. —*Paris Medical.*

4. For Habitual Constipation.—The following prescription is a favorite one with Dr. Goodell, by whom it is employed with the best results: ℞—*Ext. colocynth. comp.*, gr. ij; *pulv. rhei*, gr. j; *ext. belladonnæ*, gr. ¼; *ext. hyoscyami*, gr. ss. M. Divide in pil. No. 1. S. To be taken at bed time.

5. For Gonorrhœa.—In an article, Dr. Stoner, of the U. S. Marine Hospital Service, states that there is no one thing so useful as *Zinci Sulphas*, grs. j-iv, to *aqua rosa*, ℥j. An equal or somewhat smaller amount of *tannin* renders the mixture still more effectual.

6. For Urinary Calculi.—Dr. Köehler, of Kosten, Germany, reports success with the use of Borocitrate of Magnesia in the treatment of renal and vesical calculi, gravel, and vesical catarrh. For adults, he prescribes a mixture of 1 part of the salt to 2 parts of powdered sugar, with the addition of one drop of oil of lemon to every four ounces of the mixture. Dose, a teaspoonful in half a glass of water three times a day for a month. A one per cent. solution may also be directly injected into the bladder with advantage once a day.—*Berliner Klin. Wochen.*

7. Chronic Constipation.—*Caused by atony of the intestines.*—Dr. DaCosta finds a tablespoonful of sweet oil at night and a minim of the fluid ext. of belladonna three times a day an excellent mode of treatment.

8. For Psoriasis, Lupus and Chloasma.—Prof. Neumann recommends Chrysophan. Acid as follows: ℞—*Unguent. Simp.*, partes xl. Melt and mix with *Acid. Chrysophanic*, partes x, and *Ol. Bergamot*, gtts. x. This

ointment may oftentimes be effectually combined with tar ointment in the proportion of 1 to 8.

9. For Internal Hemorrhoids.—Prof. Andrews, of Chicago, speaks very highly of the following: Acid. Carbolici, 1 part, to 20 of glycerine; morphia, chloral or iodoform to be added as an anodyne, if deemed necessary. The dose for injection should be 2 to 4 drops, and the interval between repetitions, 4 to 10 days. Before injecting, protect the surface of the pile by application of oil or vaseline; inject slowly and only one pile at a time. Keep the patient in bed 8 to 10 hours afterwards.

10. Treatment of Gout.— Dr Schœnemann submits the following, as being without an equal: Paint the inflamed joints with strong Tr. Iodini, and give internally *Quiniæ Sulph.*, gr. viij, *Sodæ Bicarb,* ℥j, twice a day.

11. Treatment of Cholera Infantum.— First make and apply over the stomach a poultice made as follows: Powd. cloves, cinnamon and ginger, each a teaspoonful; add a small quantity of flour, and moisten with brandy. Spread over and cover with thin flannel; keep moist with the brandy. Administer the following: ℞—*Acid. Carb.*, gr. xxiv; *Spts. Vini*, gtts. xxiv; *Aqua Menth. Pip.*, ℥iss; *Mucil. Acaciæ*, ℥vi; *Syr. Papaver*, ℥vi; *Tr. Opii*, gtts. x. M. Dose, teaspoonful every two hours for a child over three months. The mixture arrests the vomiting promptly; but the evacuations continue on and change in character within 24 hours. Barley water and milk should constitute the diet. The leading features of the plan are the spice poultice, the restricted diet and the prescription, as above.

12. For Tuberculosis.—Prof. Klebs strongly recommends in apex infiltrations, even when accompanied by hectic fever and preceded by hæmoptysis, the exclusive application of Sodæ Benzoates by inhalation (grms. x a day) together with the internal administration of Benzoate of Magnesia. In place of the expectorants in common vogue, he suggests the hypodermic injection of Pilocarpine (gr. 1-6th); also inhalation of Guaiacum in decoction.—*Allg. Med. Cent. Zeit.*

13. For Carcinoma Uteri.—Dr. T. G. Thomas recommends the uterus to be washed, dried, and the diseased part saturated with C. P. *Acid. Nitricum;* tampon for 24 hours with cotton, soaked in glycerine or vaseline; after which use detergent injections, as carbolized water. The acid may be applied about once a month. Under this treatment, hemorrhage is stopped, and the patient often improves rapidly.

14. For Diarrhœa in Typhoid Fever.—Dr. O. Neile has, by repeated experience, found that Ol. Terebinth., gtts. xv, combined with Ol. Lucca, gtts. xxx, and made up with mucilage or the yolk of an egg, is a most excellent remedy for the diarrhœa and tympanites generally associated with typhoid.—*The Practitioner.*

15. For Heat Apoplexy.—Dr. Dedricksen recommends the application of ice to the nape of the neck and head, and the administration of Fl. Ext. Ergot., gtts. xv, with Tr. Aconit., gtts. iij, every hour.

15. Night-Sweats in Phthisis.—Dr. Fothergill recommends Atropiæ Sulphas, in doses varying from the seventy-fifth (75th) to the fiftieth (50th) of a grain.

the remedy may be repeated, at proper intervals, until the patient complains of a dryness of the throat or indistinctness of vision.

16. For Diphtheria.—Dr. Bell, of Glasgow, has been very successful with the following mode of treatment. The throat of the young patient is to be freely painted every two hours with the following. ℞—*Glycerin. Acidi Carbol.*, *strong Liquor Ferri Perchloridi*, and *Acid. Sulphuros.*, *āā* ℥iij. Internally the following: ℞—*Potass. Chlorat*, ℥ij; *Acidi Sulphuros.*, ℥iiss; *Glycerin.*, ℥j; *Aqua*, *ad* ℥iv; Dose, two teaspoonfuls every two hours. Port wine, soups, and milk are also to be given freely. Tonic treatment during convalescence.

17. Hypochondriasis and **Hepatic Dropsy.**—Dr. Goolden suggests, from large experience, the use of *Manganesii sulphas*, grs. x-xx, in a tumbler of effervescing mixture.

18. For Paralysis of the Bladder.—M. Suton strongly recommends ergot by hypodermic administration. He has also found it particularly servicable in retention of urine of a simple paralytic nature, and especially in cases of adynamia, coma, profound prostration, etc.

19. For Stricture of the Urethra—resisting passage of the catheter; Dr. J. C. Forster recommends a warm bath and a good dose of opium, coupled with a reduction of diet, to be repeated in three or four days, if necessary.

20. Rodent Ulcer.—Dr. B. Squire treats these cases by scraping or cutting out the diseased portion by

means of a small curette, first chilling the skin by the ether spray. Fourteen days after the operation, the wound usually heals.

21. For Small Pox.—℞—*Acid. Carbol.*, gtts. xx-℥ss; *Glycerin.*, ℥iss; *Unguent. Zinci Oxidi*, ℥vj. To be freely painted over the hands and face with a camel's hair brush. This preparation is useful in reducing other inflammations, etc.

22. For Metrorrhagia.—M. C. Paul arrests uterine hemorrhage in from 5 to 15 minutes by the following. ℞—*Ergotin.*, gr. xxx; *Aqua* and *Glycerine*, each ℥ss. Inject hypodermically from 15 to 30 gtts.

23. For Nausea in Pregnancy.—Dr. Image thinks that small doses of the *Cerri Oxalas* are useless; he recommends ten-grain doses combined with bromide of potash in all cases, as also of checking the nausea resulting from irritation.

24. For Obstinate Constipation occurring in Uterine Disorders. ℞—*Ext. Colocynth. comp.*, gr. xl; *Ext. Belladonnæ*, gr. vj; *Ext. Gentianæ*, gr. xx; *Ol. Carui*, gtts. x. One to be taken at bedtime.—Dr. Goodell.

25. For Uterine Debility.—℞—*Acid. Arseniosi*, *Strychniæ Sulphas*, *ãã* gr. ss; *Ext. Belladonnæ*, gr. iv; *Cinchoniæ Sulphat*, gr. xxx; *Pil. Ferri Carb.*, gr. l. One pill three times a day, after meals.

26. For Anæmia and **Chlorosis.**—℞—*Hydrarg. Chloridi, corros.*, gr. i-ii; *liquor Arsenici Chlor.*, f℥i; *Tr. Ferri Chloridi*, *Acid. Hydrochlorici dilut.*, *ãã*

f℥iv; *Syrupi*, f℥iij; *Aqua, ad* f℥vj. M. Dose, one dessert-spoonful in a wine-glassful of water after each meal. Not to be given for a longer period than a fortnight at a time.

27. Infantile Dyspepsia and Cholera Infantum.—The fact grows stronger each day that, in lieu of the bad milk and other unsuitable articles of diet which are being consumed to their disadvantage by thousands of infants in all of the large cities, some other food, properly prepared, ought to be substituted. Few subjects more intimately concern the public and demand the thorough study of the physician than infant diet. Every year hundreds of children perish through the lack of proper nourishment, or by being fed on food that cannot, at their age, be digested. Infantile convulsions, painful dentition, dyspepsia, and wasting diarrhœa are doubtless largely due to this absurd system of defective nutrition. In 1845 Mialhe first proved that the addition of a small quantity of diastase of malt to farinaceous products renders the latter easily digestible to a young child, in whose saliva the diastase principle was lacking. Fifteen years later, Baron Liebig, acting on this principle, made public his famous formula for an Infant's Food, which food has for nearly quarter of a century been widely adopted in Germany. Being in a liquid state, certain inconveniences have always attended its daily use; but recently Messrs. Henry Thayer & Co., our well-known chemists, by constant experimenting, have found a way by which "Liebig's Soup," as it was called, can be offered as a dry, granulated extract, which, being ready for immediate use, pos-

sesses all the advantages of the liquid form with none of its disadvantages. This product is merely Liebig's Soup in a new form; it is made solely from *whole wheaten flour* and *barley malt*, and is rendered slightly alkaline by the addition of a small quantity of bicarbonate of potash. No starch exists in the food, the flour being completely transformed into dextrine and grape sugar by the vegetable diastase of the malt. All physiological needs are thus satisfied. We have thoroughly tested this food, and are firmly convinced that it ought to be constantly recommended by physicians. The good which Liebig conferred upon the rising generations of the Fatherland cannot be measured; in its present shape, the excellent formula of the famous professor bids fair to do as much for the infants of America; we know, by personal experience, that it has proven itself not only a preventive, but a curative agent, in several bad cases of cholera infantum that had passed beyond the reach of drugs.

28. An Improved Emulsion.—Many physicians report admirable results from combining the Granulated Extract of Malt—made by Henry Thayer & Co.—with pure cod-liver oil. The following formula is a good one: ℞—*Granulated Malt*, ℥ iv; *Aqua Aurantii Flor.*, f℥ j. Triturate until well dissolved, and then add, gradually, *Ol. Morrhuæ*, ℥ iv. If desired, a little phosphoric acid, diluted, may be added to facilitate the digestion of the oil. This combination is most excellent, and far superior to emulsions prepared with sugar, glyconin, or acacia.

Sanitary Results of Bicycling.

BY ESCULAPIAN.

In all that has been written about the use of the bicycle, we hardly know of any full statement of facts and opinion from this point of view, though its influence upon health is of necessity constantly mentioned. In that respect it is entirely superior to any other mechanical means; that, above all, is its chief mission; and the attempt is made in this paper to supply such a statement, with some comparative references to other exercises.

A hard-worked bank-officer writes, "The wheel, in five weeks, has added four pounds of solid weight to my attenuated body, and made me more rugged than I have been for fifteen years." A clergyman, also, says that he "owes his physical regeneration to a bicycle." Many a mechanic whose work uses mostly one set of muscles, or is sedentary, or in vitiated air, might use the machine to a healthful purpose in getting to his business and his home. We think that a journey upon it is equivalent to a sea-voyage in general bracing effect, with differences not all in favor of the latter. There are more potent medicinal virtues in the hollow back of the bicycle than were hidden in the Sultan's bat-handle of the Eastern story. A punster sums up the result with as much truth as conciseness in saying,

"When a man becomes a good bicyclist he says 'Good-by, sick-list.'"

Bicycling does not, indeed, develop great strength, as some exercises do. It is rather calisthenic than gymnastic, and will not, like the extreme athletics, produce men of dull brains and imbruted disposition. It is favorable to mental vigor and the finer powers, and no enemy to poetry — excepting the sad stuff we see so much of from the doleful and effeminate. It gives tone and elasticity of spirits, and the quick attention required exercises the eye, the judgment, and the will. Its composite and various, rather than violent, effort brings so many agencies into play simultaneously or successively, that it is a fine training of the nerves and senses, as well as giving suppleness and endurance to the muscles. There is little in it to employ one side of the body more than the other, and the customary attitude of good riders being an upright one, it tends to produce an erect carriage. The few whose principal aim in exercising is muscular development do not seek it on the bicycle. A man may have much muscular strength, yet fail to enjoy sound health. That depends more upon the state of many other organs and tissues of the human system. It is more important that the lungs and the stomach should be vigorous, than the arms or legs. That very strong man, Dr. Winship, died, in middle age, of consumption; if he could have lifted himself on to a bicy-

cle, very likely a smaller amount of iron would have served him better than his heavy weights did. It is in its pervading and equal effect on all parts of the vital economy that the bicycle excels, which, with the singularly inspiriting circumstances of the exercise, are what make it so efficacious.

Like horseback riding, it is specially indicated for morbid states of the blood, such as plethora and its opposite, anæmia; for obstructions of the liver and spleen, incipient obesity, hypochondria, and many nervous and debilitating maladies. Its effect upon the kidneys is milder, but similar to that on horseback. In some cases of consumption, dyspepsia, gout, diabetes, scrofula, it is calculated to be a most efficient remedy. No less important than the physical effect is, that it produces the cheerfulness, moral energy, and self-control necessary for resisting the tendency to yield to disease, which, in chronic cases, is so often a worse foe than the disease itself. Its hygienic or preventive powers are still more ample and decisive than its curative ones; it cannot fail to act on the organism as a potent, conservative, and energizing agent, though it should fail to restore a diseased one to its normal health.

Medical authors testify that hernia is often caused by horseback riding. This arises from the jolting motion, by which the diaphragm and abdominal walls rudely shake and compress the intestines. The more uniform and gentle action of the bicycle,

with all the elastic appliances that go to a good roadster, insures complete immunity from that, and, by strengthening, without straining, the abdominal muscles, will prevent disruption from any cause. Moreover, we know of quite a number who, being ruptured, yet ride the wheel without inconvenience.

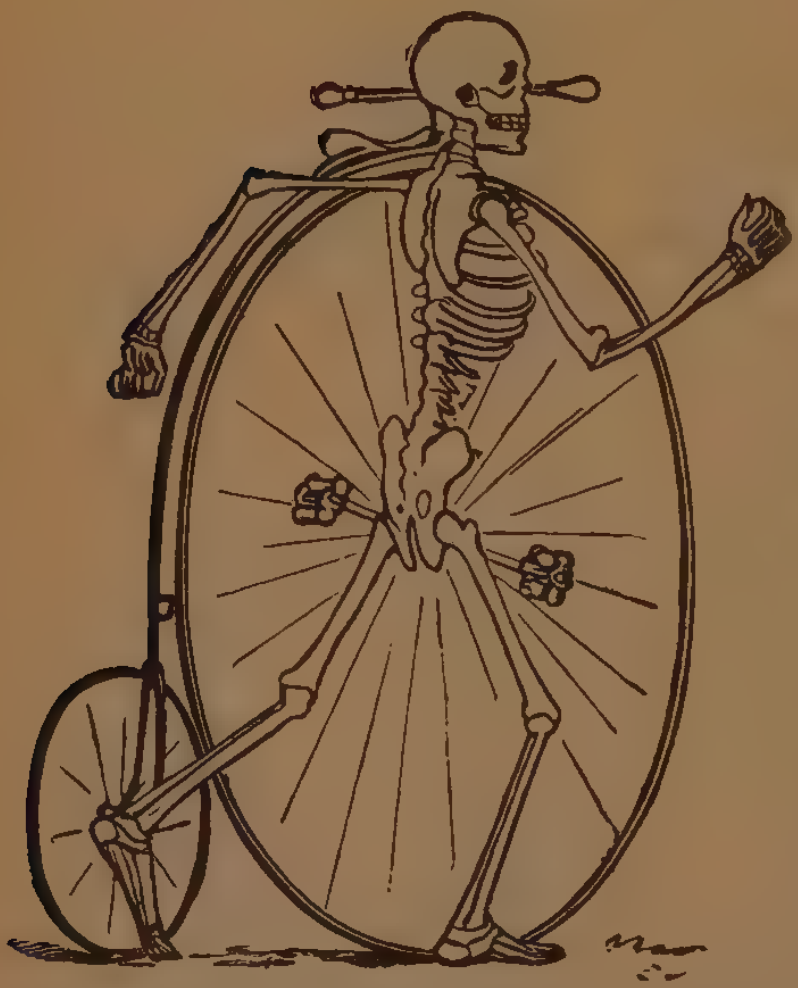
Some, in England, having asserted that bicycling specially tends to cause a varicose condition of the veins, the British Medical Journal recently contained letters from physicians, denying that such was the fact. Their conclusions are, that where a previous tendency of the kind exists, excessive or violent riding, like any severe strain, will develop the malady; but that moderate bicycling "will strengthen the coats of the veins, in proportion as it improves the general health;" that in no case can the bicycle produce this trouble unless there be a predisposition to it, which is, generally, a matter of inheritance.

Most people are aware of the insufficiency and disagreeable effects of carriage riding for those who are at all capable of taking more active measures; and those who practise the long, daily walk, as a sanitary necessity (and a listless task), often feel, on returning, a weariness of brain and limb that, temporarily, incapacitates rather than recruits them. This effect is the reverse of desirable for the sedentary or intellectual man, who requires recreation in the literal sense of the word. Bicycling in moderation furnishes that in the highest degree. Its

astonishing peculiarity is, that so much renovation and exhilaration comes of so little effort, and is followed by so little fatigue. This is a matter of constant surprise to even veteran riders. The reason is, because it recreates a man from within outward as much as by the physical conditions, and makes the blood run sparkling, with feelings of jubilant self-reliance and hilarity. We have seen *Ride si sapis* quoted as the comprehensive motto for the wheel and its inseparable mirth. There is nothing, not essentially ludicrous, that is so provocative of mirth, in various ways. The curiously lifelike movements of the machine, which seems to become one with its rider, and to enter into the spirit of the rapid motion, enhances the total effect. Much of its charm arises from the harmless excitement of meeting difficulties and dangers more apparent than real, and the fact that the rider's entire career is the result of his own volition, yet accomplished with so much ease. The exercise is suited to a wide range of needs and abilities; it readily adapts itself to the special requirements of the less hardy ones, as well as to those of the most robust. Improved springs and new devices are lately used, that prevent the harsh vibration at the base of the spine, which has been worse than a discomfort to some. Excepting that, we know of no specific ill effects that can come from a reasonable use of this method of locomotion; and the frequent practice and prescription of it by

medical men, on both sides of the ocean, indicates as much. —*From "Whirling Wheels."*

The Bicycle for Physicians and Patients.



Practising physicians have not failed to observe, in very recent years, the value of the bicycle as a tonic for the human system. Many, as one of them has written, "regard this preparation of Iron as better than any in their Materia Medica." Fresh air, sunlight, change of scenes, bodily exercise, and mental diversion, are restoratives which every physician has frequent occasion to prescribe, and even to contrive how he may induce his patient to take. Horseback riding, driving, boating, gardening, light

gymnastics, — how often are these recommended by the medical adviser; and how often is the advice unheeded for want of means or facilities to carry it into beneficial effect!

The bicycle secures for its rider all the above-mentioned requisites, and is available to nearly all.

For the aged and the disabled the tricycle is an easy substitute, and nearly all may be said in its favor that is urged for the bicycle. So what is said of "the wheel" may be taken to include the application to both forms of the modern velocipede.

The use of the bicycle calls into exercise the muscles of the trunk and of every limb of the body, in an evenly distributed and exhilarating play. It quickens the circulation of the blood, strengthens the respiratory organs, tones up the nervous system, stimulates the digestive and secretory organs, and consequently induces good appetite and sound sleep. It is less wearisome than horseback riding, less monotonous than gymnastics, more positive as a functional stimulus than driving, and more available, economical, and enjoyable than either of these, or than boating and other forms of physical recreation.

"Bicycling has cured me of insomnia," writes a divine. "I was afflicted with constipation until life was a burden," says a busy solicitor, "and no dose was effective for relief; since I took up bicycling I am regular as the sunrise." A successful merchant assures the writer that he suffered much distress and

frequent treatment for piles; but the wheel has made him whole. A prominent lawyer informs us that he was a marked victim of consumption, and was cured by bicycle riding to and from his office. A banker suffering the miseries of dyspepsia followed the writer's advice and example, and became ruddy with health and a hearty eater, from continued bicycling.

Of course these instances, and many more which might be cited, are only illustrations of a principle known to every physician, and the same results might have followed the adoption of other means of physical recreation, involving positive bodily exercise in open air and sunshine, with mental diversion.

What gives much of the superiority of bicycling is the peculiar fascination attending it; a charm almost unexplainable, but recognized by every wheelman. An exercise in which one takes an interest, or which leads as a means to an attractive end, is doubly efficacious.

So far we have written with a sincere desire to encourage physicians to recommend bicycle riding as a promotive of health. "Physician, heal thyself." Thou needest the *positive* exercise which the practice of thy profession does not give, and the diversion of brain and senses which thou wouldst recommend to others. *Verbum sat sapienti.*

The horse and buggy is considered a necessary part of a physician's outfit. To most young phy-

sicians, at least, the bicycle is destined to be considered as necessary. By some it is used instead of a horse; by others, as an additional resource. It is ready to mount, without waiting for harnessing or care; it never runs away when left; it costs nothing to stable it, and it costs only the price of a poor buggy to begin with. It therefore saves both time and money, while it conserves health, and in one accredited instance, at least, has saved a patient's life by its speedier conveyance. For visits or sudden calls in office hours, and for night use, it is much more available than a horse.

While lawyers are riding it to and from their offices, and clergymen are making by its aid their exchanges, and college professors and school-masters are by it enabled to "keep a carriage" and keep their health at the same time, it is not strange that physicians are already availing themselves of this modern chariot to a considerable extent, and the only wonder is that it does not with this professional class become almost universal. Abroad they are more nearly so; but in America it is only within four years that they have been easily accessible. This perhaps accounts for the fact that comparatively few physicians ride them. Now America not only has the largest bicycle factory in the world, but produces the finest and most reliable, and has dealers in all large cities. The Columbia Bicycle is as accessible as the Springfield Rifle, and as excellent.

The facts about bicycles for general use can, however, be obtained from any dealer. What we wished to call attention to, and that which induced us to give so much space to the bicycle in this little manual, is its claim on the attention of the practising physician, —*first*, as a prescription for convalescents and chronic, but not entirely disabled, invalids; and, *secondly*, as a useful instrument for the practitioner.

[From *Physician and Patient* for April, 1880.]

The Effect of Bicycling on the Health.

The hygienic effects of the use of the bicycle have received little public mention from the medical profession in this country as yet, though the increasing prevalence of their use, both as a recreation and as a means of conveyance, entitles them to some consideration. In our principal cities and their suburban towns the number of bicyclers is already large, and at our colleges it is being rapidly taken up. At Harvard, for instance, there are more than ninety young men devoted to this practice; and the indications observable are that it may become as nearly universal among our younger men as it is in Great Britain. The relations of this vehicular epidemic, if we may so call it, to the physical health are, therefore, of some importance.

To the questioning lay mind there is probably some apparent answer in the fact that many physicians ride the wheel, and thus, by example at least, encourage bicycling. We know of several instances, and in others it has been recommended to patients by medical advisers, as horseback riding often is. And of course, so far as it induces the convalescent or the well to take the open air and sunshine, and adds a stimulus of interest, it must be beneficial.

Passing for a moment the matter of accidents, what is the character of the exercise upon which the bicycler enters? Handling the machine, when off it, is evidently the lifting of 40 to 50 lbs., or a gentle pushing of the same weight on a sensitive pair of wheels, combined with direction and resistance to any tendency of the machine to fall over. All this involves gentle and varied muscular action. Now see him mount. Standing back of the machine and extending both arms to their utmost, he takes an end of the handle-bar in each hand, places the left toe upon a step some twenty-two inches high, takes two or three pushing skips on his right toe, half springs and half raises himself till his limbs are straight, and then glides to his saddle and takes the pedals with his feet, while he has preserved the balance of his vehicle, which is still in motion. The greater part of this effort has, of course, come upon the muscles of the toes and legs; whilst those of the pelvis, the trunk, and the arms have all contributed.

As he rides, the motion of the legs is very much like that of walking a gentle incline, with the difference that the weight of the body is more or less transferred from the soles to the saddle; the feet move through circles, and thus there is wider action of both flexor and extensor muscles, and there is a constantly variant action and an elasticity arising from the fact that the *piece de resistance* is always at the ball of the foot and never at the heel. The arms are busy at the same time, guiding and aiding to preserve equilibrium, as are also nearly all the muscles of the neck and trunk, not only from positive action, but also from the infinitely varying position of the rider. Dismounting is either a reversal of the process of mounting, or a gentle vault from the pedal while swinging one leg over the machine and resting part of the weight on the hands.

In ascending grades, or riding a rough road, or against a head wind, there is some lifting on the handles which increases the intensity of action of the muscles, not only of the arms and legs, but also of the chest, back, and abdomen, and this may be increased at will; while in descending grades or going with the wind there is less or no action of the muscles, except in preserving equilibrium. In this as in any muscular efforts the heart and the lungs are necessarily urged to better work; the vital processes are quickened, and what may be called bodily combustion of fuel is promoted. Hence the

proverbial appetite of bicyclers. Either intense, rapid, or long-continued exercise, however varied and well distributed, induces perspiration, and, in time, greater or less exhaustion. This will follow bicycling under sufficiently arduous or continuous effort.

It is singularly free, however, from special discomforts, such as foot-soreness, saddle-chafing or lameness. In fact, this exercise is less wearisome than walking, less violent than horseback riding, more varied than either, and has all the good qualities of both. The effect on the kidneys and liver, for instance, is of the same character as in horseback riding, but milder.

Upon careful examination of the subject there do not appear to be any special dangers attendant upon this active form of exercise. Prudence is required as to over-exertion, riding on an empty stomach, and taking cold after perspiration, just as in the case of any other positive recreation. A few years since there was considerable said and also written about a liability to hernia from the use of the old two-wheeled velocipede, — an instrument which was considerably different in principle as well as in the position and muscular operation of the rider; but the cases were rare; and not an instance of this arising from use of the bicycle has been reported in the journals or has come to our knowledge. So far as we can ascertain the only danger to which the bicycler is ex-

posed is that of accidents. Broken bones, bruises, and even death in two instances, have resulted from being thrown from bicycles. At ordinary speed, however, a fall is not likely to cause serious injury, since the distance is not great, and the force of the fall is tempered by the fact that one is let down over an arc and usually saves himself with the hands or feet, or both. This possibility of accident is inherent in skating, swimming, rowing, equestrianism, shooting, and all the manly diversions; and it is only the careless who suffer from it. The observed and reported facts would indicate that there is a lower average of accident with bicycling than with any other means of exercise or locomotion except walking.

So far as observation has yet extended, it may therefore be said that the general hygienic effects of bicycling are beneficial. Whether used as a means of locomotion, or an implement of reasonable sport, it leads to fresh, pure air, to sunshine, to recreative change of theme and of scene; it quickens the organic functions, tends to an even and well-distributed development, promotes appetite and digestion, and induces rest and sleep. So healthful and comparatively economical and ready is it, that we may expect the judicious use of the bicycle to be recommended by physicians, and look for litheness, vigor, and manliness, in the rising generation of men from its introduction.

LAKE CITY, MINN., Feb. 27, 1882.

THE POPE M'F'G CO.: —

GENTLEMEN, — In reply to yours of the 24th, I would say, that I find the bicycle a most valuable aid to the physician, especially when located in a small city, or suburban town. It would occupy too much space to enumerate the advantages that a bicycle posseses over a horse, and doubtless it has already often been done by the votaries of the wheel; but I would say, that for making odd calls, where the distance is too great to be walked, and not long enough to repay one for the time and trouble of harnessing a horse, the bicycle stands unrivalled. In fact, I can distance a horse on a fair road, on an equal start, though I never mounted a bicycle or velocipede before last August.

Conservative persons have remarked that it might be thought undignified for a physician to ride a bicycle. If there is anything undignified in the appearance of a graceful rider (and who may not become one if he perseveres?) I would like to know wherein it is manifest.

As a means of recreation for an overworked physician, or any other man, where can an equal to the bicycle be found? I own a "Shadow" canoe, and am an ardent lover of aquatic sports; but, to go in my canoe, I must walk to the lake, get my boat out, rig the sails, etc.; and I often forego a short ride for that reason.

The bicycle is always ready to go at a moment's notice, and I know of no pastime so enjoyable as a spin on the wheel. One gets the muscular exercise of rowing, in a modified form, and the bracing air, and the feeling of freedom experienced when on the back of a free-going horse,— while the steadiness of hand, and keen judgment sometimes required, find their similitude only in the ice-yacht, with its record of better than a mile a minute.

Only yesterday, when, after a ride of twelve miles and return over a rough country road in a breaking-cart, I found myself the possessor of a first-class headache, a fifteen-minute ride on my Columbia brought me back all aglow, with not a vestige of my cephalalgia remaining. I could write much more, for I am a lover of the wheel, but I am now called away, and will substantiate my praise by mounting for one of those odd calls which are now a pleasure to make, instead of a matter of annoyance — occurring, as they do, during office hours.

To my brother practitioners I would say, — Get a Columbia.

Respectfully,

E. A. PATTON, M.D.

You inquire if my brother rides a bicycle. I have no brother, — "but if I did have a brother, he would" ride a bicycle!

E. A. P.

DUNKIRK, N.Y., March 2, 1882.

POPE M'F'G CO., Boston, Mass.: —

GENTLEMEN, — I hardly know just how to write you in reply to your inquiry — not that there is any doubt in my mind as to the beneficial effects of bicycling, but from the fact that if I was to "speak right out in meetin'" my letter would read too much like the recommendations of a quack remedy. I can truly say, however, that I know of no form of exercise at once so beneficial and agreeable. Its effects on me have been surprising as well as delightful. I was sick, and it made me well; weak, and it made me stronger; but above all it freed me from persistent insomnia. Only those who have passed night after night in sleepless vigil, wishing for the dawn, can fully appreciate what this means.

To busy brain-workers the bicycle is a Godsend; almost, if not quite, a necessity.

To learn to ride is not nearly so difficult as it looks, — and, once learned, the art is not likely to be forgotten.

Yours very truly,

GEO. E. BLACKHAM, M.D.

P.S. I ride a Special Columbia.

"Let us first see why bicycling is heathful: It is because it is an exhilarating, evenly distributed, out-of-door exercise. The mind is pleasantly occupied;

nearly every important muscle in the body is brought into gentle play; to supply the waste of tissue thus occasioned, the blood circulates more rapidly, and the heart and lungs, stimulated through the influence of the great sympathetic (*pneumo-gastric*) nerve, are brought into more vigorous, yet not excessive, action. The exercise being in the open air, the supply of oxygen is ample, and as the rider inhales deep draughts of vital air, its stimulating, life-giving effects are felt in every nerve and muscle, and the result is that glorious sense of power, of uplifting, so to speak, so well known to those who have experienced the delights of a morning spin over a country road." — *From an article by a Physician in "Whirling Wheels."*

PHYSICIAN'S LETTER. — A letter taken from the *Lancet*, published in England: —

SIR, — In answer to your correspondent, "Viator," I have been a bicycle-rider for the last five years, with an ever-increasing delight the more proficient I become. This summer I have turned both my horses out to grass, and have trusted to my bicycle alone, doing on an average about fifty miles a day. I find I get through my day's work with less fatigue than on horseback, and without the monotony of driving. My work is done quicker, and my usual pace is ten miles an hour, and I can go at the rate

of fifteen when pressed. A bicyclist's steed is always ready saddled, and, on arriving at your destination, does not require a boy to hold him. It can be ridden with almost as much ease in wet as in dry weather, but is not adapted for a very hilly country, though all moderate hills can be surmounted.

The above remarks apply only to a thoroughly good machine, of the latest construction. Since I invested in my new 52-inch, I rode ninety-five miles in one day without unusual fatigue. I can confidently recommend all men who are fond of exercise without fatigue, and who wish to curtail their stable expenses, to take the trouble to learn the bicycle.

Yours, obediently,

A COUNTRY SURGEON.

A LIFE SAVED. — A New York correspondent sends the following: —

"As Dr. G. F. Marsden, of Red Bank, N.J., was sitting quietly on his stoop a few evenings ago, resting from a short spin on his wheel, a friend rushed up and excitedly requested him to jump 'on that thing,' and see his wife, who was attacked with hemorrhage. It takes the Doctor's man seven minutes to harness; in five minutes the Doctor was at the lady's home, — a distance of nearly a mile, — and before her husband reached the bedside the flux of blood

was stopped. Dr. M. says, a few minutes later, and his services would not have been required. The gentleman and lady are now warm advocates of the 'wheel,' and the Doctor considers his bicycle well paid for." — *From The Bicycling World.*

WOBURN, MASS., March 17, 1882.

ALBERT A. POPE, Esq., *President Pope Manufacturing Co.* :—

DEAR SIR, — Having purchased of you a tricycle for my invalid daughter, — realizing from day to day the great good she has derived from its use, — I take the liberty to write concerning the matter, hoping our testimony may induce others to examine the tricycle, and be equally benefited.

Permit me to state, — Bertha was born with anterior and lateral curvature of spine; her right knee-joint reversed, and feet so badly turned inward that the great toes touched upon the inner leg more than half way to the knees. One doctor after another accepted and abandoned the case during more than ten years of her early life; each one stating that she could "live but a little while."

Fresh air and exercise her life was dependent upon.

A disinclination to exercise was settling upon her, telling its own story of feebleness and fatal results.

How to get her out of doors for exercise and fresh air; how to encourage her to use her own powers of motion; how to keep her limbs warm by natural circulation of blood, had become a sorely perplexing question, — when it came to my thought, possibly she may be able to ride a tricycle. At once I went to your sales-room, saw one, mounted it myself, and, testing strength requisite for its action, determined to let her try it.

This was late in October. Favored by having a large, new, unoccupied stable located near the house, she was able to practise riding in any condition of weather. She became so much interested that she insisted upon riding, not only every day, but rapidly increased the length of time so spent. Her progress in managing her tricycle and her improvement in health amazed me. She insisted she could go with it upon the street with perfect safety, after having practised riding within the circumscribed limits of the stable. Accordingly I gave my consent for a public appearance on the first fair day, when the roads were in suitable condition. She waited in vain for a day till New Year's came.

When I saw her fairly off, alone, safely guiding the precious life over which I had for seventeen years agonized; when she had rolled afar, over a long stretch of smooth road, and, by agreement, waited at the slight ascent for me to reach her; when in gleeful tones she almost shouted, "Mother,

this is a day of new birth for me; I am FREE," — be assured most grateful memory turned toward the bit of shining mechanism which did her bidding, and indeed made her "free." We remember it as the happiest day of her life and mine.

Wishing you success, which onward work for humanity deserves, — ever grateful for what your skilled workmanship has effected for my daughter,

I remain, yours for progress,

SUSAN TAYLOR CONVERSE.

[From The Medical News.]

Contrast the man who limits his daily physical exercise to the use of the dumb-bells, the cross-bars, and a stroll in the evening, with the man who takes his daily run on his bicycle, and you will find, in the majority of instances, that the preponderance of health and strength is largely on the side of the latter.

The reason is, that bicycling implies out-door exercise, that is, life in the air. Five minutes in the air are worth more than fifty minutes in a gymnasium to any person in search of health; and if such is not the case why do we prescribe a drive or a boat-ride to so many of our patients? But bicycling implies something more, — it brings into action every muscle of the human body. However graceful may appear the rider, however motionless

he may seem, still it is not possible to ride on a bicycle without causing every nerve, fibre, and muscle to maintain each a certain degree of movement.

A man may walk without moving his arms; he may use the dumb-bells without moving his limbs; indeed, he may exercise any one portion of the body without exercising any other portion. It is not so with bicycling. Herein all parts are set in action, and not only the outer frame, but the viscera as well. It is not possible to find a condition of fatty degeneration in such persons, or even a case of partial paralysis.

Lastly, bicycling is the mode of exercise for the man of weak heart, as it is called. Still it is the weak-hearted men who most need exercise. To all such it is common to suggest running, walking, leaping, and the like; but every such attempt proves an over-exertion. Bicycling forces air into the lungs; it causes the air-cells to expand; but in such a way is this expansion carried on that the strain is not felt, and strength comes by degrees and slowly.

It is no argument against bicycling that one or two persons have died from heart disease while riding on the bicycle. Have not thousands perished from the same complaint while sitting quietly in their chairs? — *From an article on "The Hygienic Advantages of Bicycling."*

TOWANDA, PA., March 18, 1882.

THE POPE M'F'G CO.: —

GENTLEMEN, — Before an actual experience with the bicycle I thought that as a means of affording exercise it was only useful in developing the lower extremities; but after riding one I find I had a mistaken idea in regard to the virtues of the machine as a means of recreation and exercise. I find that it calls into play and develops the muscles of the arms and trunk as well as those of the legs; in fact, all the muscles of the body, unless it is those of the face and head. As a health-giving medium it is greatly superior to walking, in that it calls into action the entire voluntary muscular system, so that when fatigue is experienced from bicycle riding it is not felt in one part more than in another, but that each set of muscles has added its complement to the whole muscular force exerted.

But, furthermore, the feeling of buoyancy and exhilaration that is produced by rolling along on a bicycle adds largely to the beneficial effects of the exercise. In fact, without this condition of the feelings, exercise falls short of the good intended.

Finally, I would say that it is better than any system of gymnastics in its simplicity and efficiency in affording health and happiness.

Very respectfully,

S. M. WOODBURN, M.D.

SCRANTON, PA., March 15, 1882.

In writing of the bicycle from a physician's standpoint it may be proper to give a clue to the writer's status in the profession, if he has not the advantage of a metropolitan or a literary reputation. I will briefly preface that I am a regular graduate, have practised twelve years, and made most of the capital operations in surgery. I am also familiar with and a lover of all out-door sports: hunting, fishing, skating, base-ball, the horizontal bar, etc. Of all these exercises I preferred riding, having ridden on horseback constantly for twenty years, five of which were in the army. Last summer, having mastered the bicycle, I exchanged the finest saddle-horse I ever owned for a fast trotter, and have entirely abandoned the saddle for the superior advantages of bicycle exercise. These advantages, in my opinion, are, that the exercise is more active, and far more beneficial to the lungs, as well as the whole system. My chest expansion has increased two inches, and my weight twenty pounds, since using the wheel.

I am no longer conscious of a slight adhesion of the left lung, which worried me (since having pleurisy during the war) until last year. The wheel is more easily learned than the horse. I have had many a severe and dangerous throw from the latter, but never one from the bicycle; and I know of no possible anatomical or physiological objection to

this form of exercise, except it be in excessive fatigue, which any fool should know how to avoid.

J. EMMET O'BRIEN, M.D.

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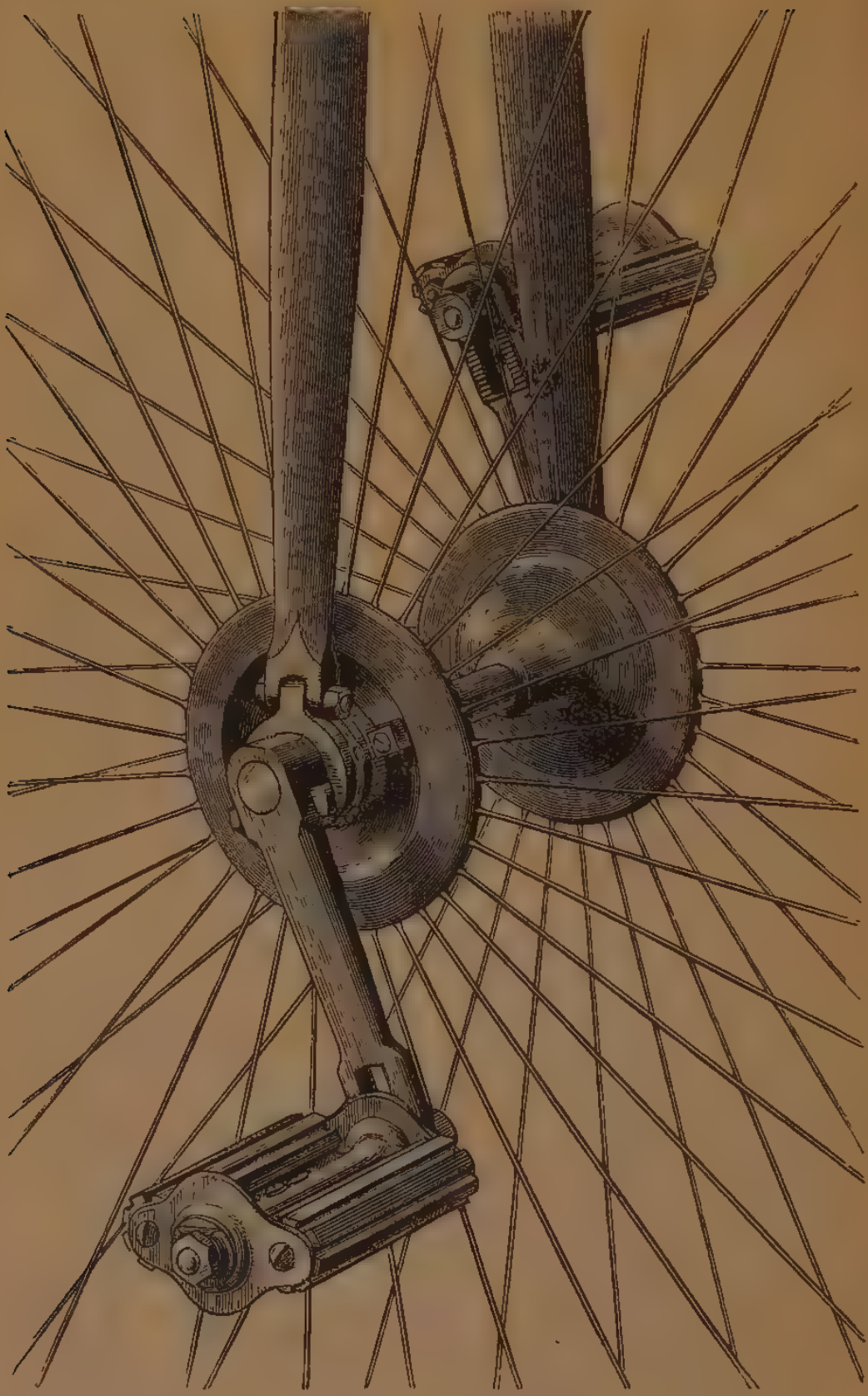
Attention is invited to an examination and trial of our unequalled preparation of steel and rubber for ameliorating, enlivening, and prolonging human life.

Dropping the metaphor, we ask the physicians of America to consider the following facts: —

The bicycle has been the subject of constant inventive and mechanical improvement for the past fourteen years. Some twelve years ago it was widely made and used in this country for a season, but failed, from its imperfect construction, to meet the popular expectation for a practical road vehicle, and was dropped as a failure. It was, by a few physicians, in its then form, considered dangerous, as occasionally producing hernia and injury of the prostate gland, etc. Perhaps it was. But foreign makers continued to improve it. Its use has spread all over the world. Hundreds of thousands of men are riding it to-day in every civilized country. All classes, professions, and ranks of life, are repre-

sented amongst its riders, and it is put to all the uses of a vehicle, an athletic instrument, and a recreational attraction. Five years ago we began its introduction in a commercial and manufacturing way into this country. We had the disadvantage of the previous failure to overcome. The American people have been slow to take it up in its new form; but **TWELVE THOUSAND** of them have already, and the number constantly increases in a geometrical ratio. We have perfected the machine until the **COLUMBIA BICYCLES** are the finest and staunchest and easiest running in the world. Our factory is the largest one on either continent; nothing except the sewing-machine and telegraph has ever made such rapid advance into popular use and favor. We are not the only makers or dealers in this country now; but we hold, and mean to keep, the lead, both in facilities and in excellence of product.

The modern **COLUMBIA BICYCLE** not only does not produce hernia, but those who have already suffered in that way ride it with benefit; it does not injure the glands, or other parts or functions of the physical man, as hundreds of fathers of young families can testify; on the contrary, it is the greatest health-promoter, and the safest, by actual comparison, of any of the out-of-door means of recreation.



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bicycle is also a first-class roadster, of somewhat different style from the other, but equally well made; and it has not only held its own for four years in the market, but it is in use to a greater number than all the other makes of bicycles in this country.

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They are of different **STYLES** of finish, to suit the most fastidious. They are sold at **LOWER PRICES** than any others even approaching them at all in quality and style.

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